Schmeltzer, Max

Researches in the Kjökkenmöddings
and graves of a former population
on the coast of Labrador.

ART. II. — RESEARCHES IN THE KJÖKKENMÖDDINGS AND GRAVES OF A FORMER POPULATION OF THE COAST OF OREGON.*

By Paul Schumacher.

Plates 2–8.

With two hired men and a camp outfit, I left San Francisco toward the end of September, 1875, on board of the United States revenue-cutter Richard Rush, Captain Baker, having received permission to take passage on one of her northern cruises. We made landing at Port Orford, in Oregon, September 27, and the following day pitched our first camp near the fresh-water lagoon, a little to the north of the point.

From here I dispatched one of the men 45 miles down the coast to Pistol River to bring pack-animals, for which arrangement had already been made; I also engaged, in addition to the help already employed, two Oregonians in my party, whom I knew to be good packers and able hands for an expedition full of hardships, exposure to the elements, and hard labor, all of which I justly anticipated.

Before the arrival of men and animals, I, with one man left, investigated the neighborhood of the lagoon, so advantageously adapted for the location of aboriginal settlements. Near the mouth of the outlet of the lagoon, we discovered the site of a small settlement (Map 1) [Plate 2], the location of the huts being still indicated by several circular depressions, with an embankment around it of 1 or 2 feet above the average level of the somewhat elevated position, which, toward the sea, abruptly terminates in a bluff of nearly 50 feet. Across the river, dunes border the ocean for about a mile to the northward. Looking in that direction, we gain a good view, although a part of the lake, or lagoon, is hidden by the heavy timber on the right, while to the southward the steep ascent of the high rocky point immediately obstructs any view in that direction; leaving a grassy, steep cañon to the eastward, with a small running stream of good water, which passes at the foot of the settlement. About half-way from this station to the lake, and on the county trail, we find another small deserted *rancheria*. The

[* This and the succeeding article by the same author are the outcome of explorations conducted under the joint auspices of the Smithsonian Institution and the Indian Bureau, for the purpose of making a representation of the archæology of the California coast at the United States Centennial Exposition. The articles are furnished by the Smithsonian Institution for publication by the Survey. The illustrations are from maps, sketches and plans furnished by the author.—Ed.]

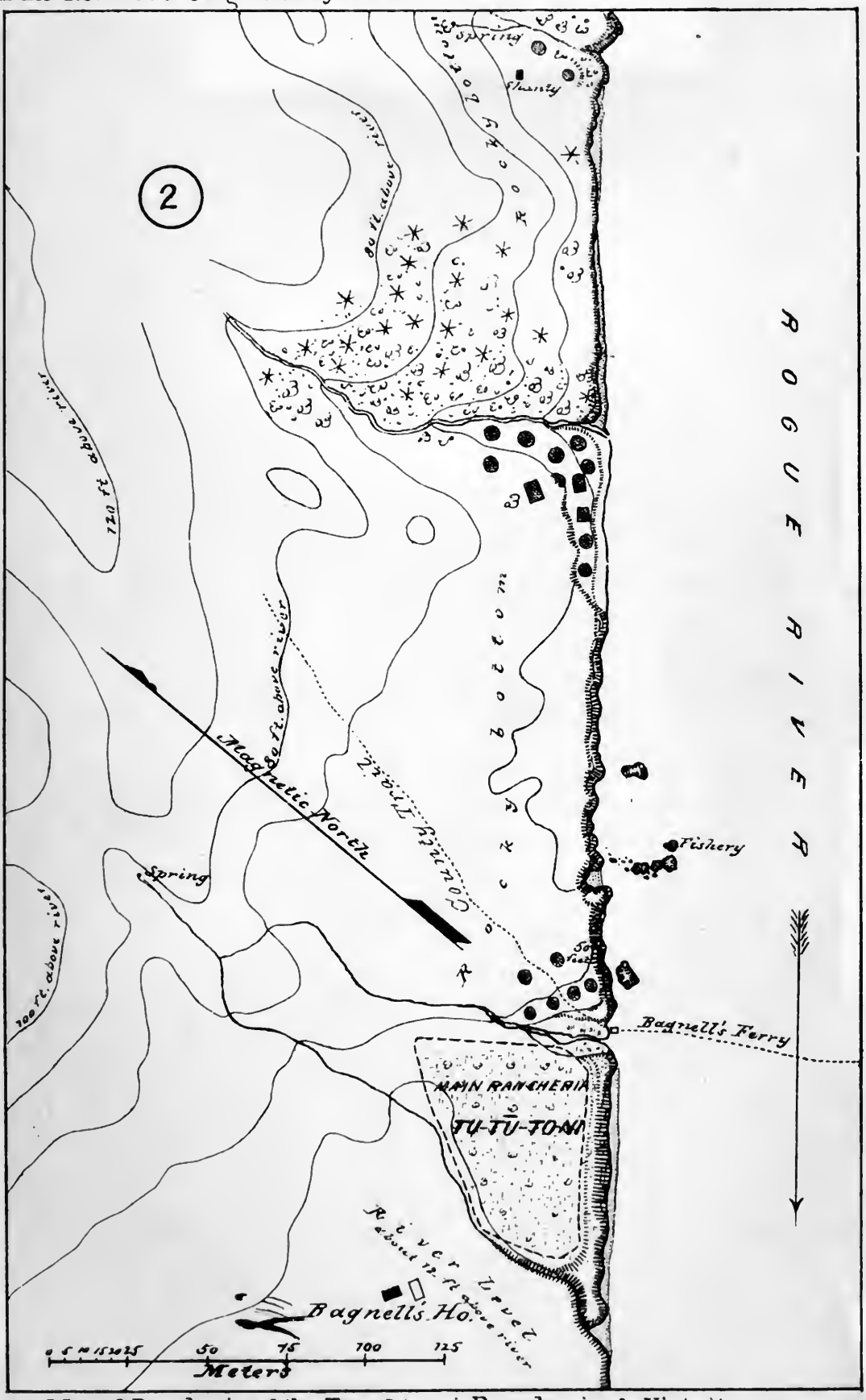
shells, which are at the first more mixed with sand and overgrown with grass, are here quite bare on the surface, which adds a fresher appearance. I looked for graves, employing the methods suggested in my southern tour, but all failed; and as even the house-sites yielded no skeletons I was inclined to believe that no graves exist here, where, by the signs, dwellings had existed only for a short time. At the mouth of the creek which supplies the small scattered town of Port Orford with water, is seen a moderately large shell-mound, partially washed away by the waters of the creek and the ocean as well, while back of the bluff, where the ground gently descends, several buildings and a garden cover the site of the deserted Indian town, thus making an exploration of the place impracticable.

During our reconnaissance, the Indians still dwelling in several places northward from here, and many others, well armed with rifles, who were passing on hunting excursions, watched our proceedings rather suspiciously, but made themselves welcome in our camp, and enjoyed our somewhat aboriginal dinners with much gusto. The meeting with Indians is not pleasant to an explorer of their forefathers' deserted hearths, as their friendly feeling is easily disturbed, and their superstitions alarmed by researches among the remains and graves of their ancestors; for this reason we did not visit Elk River, Sixes River, and other localities north of Port Orford, where Indians still live.

Our animals had in the mean time arrived, and after experiencing the first rain of the winter season, we started, on October 6, upon our way to Rogue River.

About 10 miles south of Port Orford, in the neighborhood of the rocks called "Three Sisters", on the bank of a creek, and close to the abrupt shore, we find the kjökkenmöddings of a former people located on a small flat—now covered with an orchard—bordered by the creek, and toward the sea by the ascending shore, the close proximity of which is only revealed by the roaring of the ocean, while an open view is had back in the valley. This station, I think, was the northernmost *rancheria* of the *Yu-kwā-chi*, while another one is found at Mussel Creek, about 5 miles farther south, and the largest of all at Yukwa Creek (which stream is now usually termed Euchre Creek, being a more familiar expression to the Oregonians of the present day). All these places are now under cultivation and partially occupied by building, whereby the signs, save the kitchen-refuse of the former inhabitants, became obliterated and covered. From Yukwa Creek, the trail trends back from the coast, and we could not observe the smaller settlements said to exist between here and Rogue River. A thick fog was also a strong impediment to our observations during the entire trip from Port Orford to Rogue River.

Arriving at Rogue River, we went into camp below the ferry, located at the place where the main *rancheria* of the *Tu-tū-to-ni* once existed (Map 2) [Plate 3], about five miles from the mouth, and on the right or



Map of Rancheria of the Tu-tū-to-ni Rancheria & Vicinity on Rogue River.

north bank of the river. Over the main *rancheria*, marked by a thick layer of kjökkenmöddings, we find the usual obstruction, an orchard; while across the rivulet (the efflux of a spring issuing but little over 150 yards farther up on the rocky rise), the house-sites remained well defined; which we also notice 150 yards farther up the river, in an indentation of the steep shore, and still in another similar nook at a distance of 100 yards farther on. These places were still inhabited at the time of the Rogue River war in 1856, when here, on the left bank of the river, just across from the main *rancheria*, peace was accepted by the leader of the United States Army, and the Indians were accordingly removed to reservations. The present owner of the land and ferry, a "squaw-man", liberally gave us permission to dig in his orchard, where all signs of former houses were obliterated by the plow and obstructed by high weeds and trees. Although we made a careful search for graves, the many test-holes we dug revealed only sites of houses; the kitchen-refuse consisting of all kinds of shells (see Smithsonian Report of 1873) and a great many bones of elk and of deer, averaged about 8 feet in depth at the main station, while none were found across the rivulet on the rocky ascending bottom, where it is likely the rains had washed them into the river, and very few, not enough even to form a layer, at the two upper town-sites. The houses we excavated were square; that is to say, the subterranean part reached to a depth of about 4 feet below the surface, and measuring variously from 6 to 10 feet square. The casing of the excavation consisted of boards arranged horizontally, contrary to the vertical position in the houses of the present Klamath Indians, and was kept in its place by posts along the front. The general impression which the traces of an old aboriginal town-site makes is that of a group of huge mole-hills inverted or sunk to a small rim at its base (Sketch A) [Plate 4]. Although the excavation was found to be square, the remaining concavities, always shallow, and hardly ever more than 3 feet deep, were circular, which is attributed to the circular embankment that still surrounds it, and to the natural action of the elements in filling up a depression in loose ground. No doubt, the superstructure of the hut was of a circular shape, corresponding to the remaining embankment, and was probably placed in such a manner as to meet conically, and was covered with earth, &c. The fireplace we find on one side of the floor in a small excavation, and the smoke escaped through a draft-passage, as shown in section sketch (B) and the plan (C) [Plate 4]. We find among these house-sites a few well-preserved ones, exceptionally with square embankments (compare the sites of the first branch settlement, Map 2 [Plate 3]), but they are no doubt of recent date, and a modification between an aboriginal hut and a white man's shanty, such as we had occasion to witness among the present Klamaths at the mouth of the Klamath River, one of which I show in sketch (D), as also an inner view (E), a plan (F), and a section (G) [all on Plate 5]. The inner view shows the depression, which is in this case pentagonal, incased by boards placed

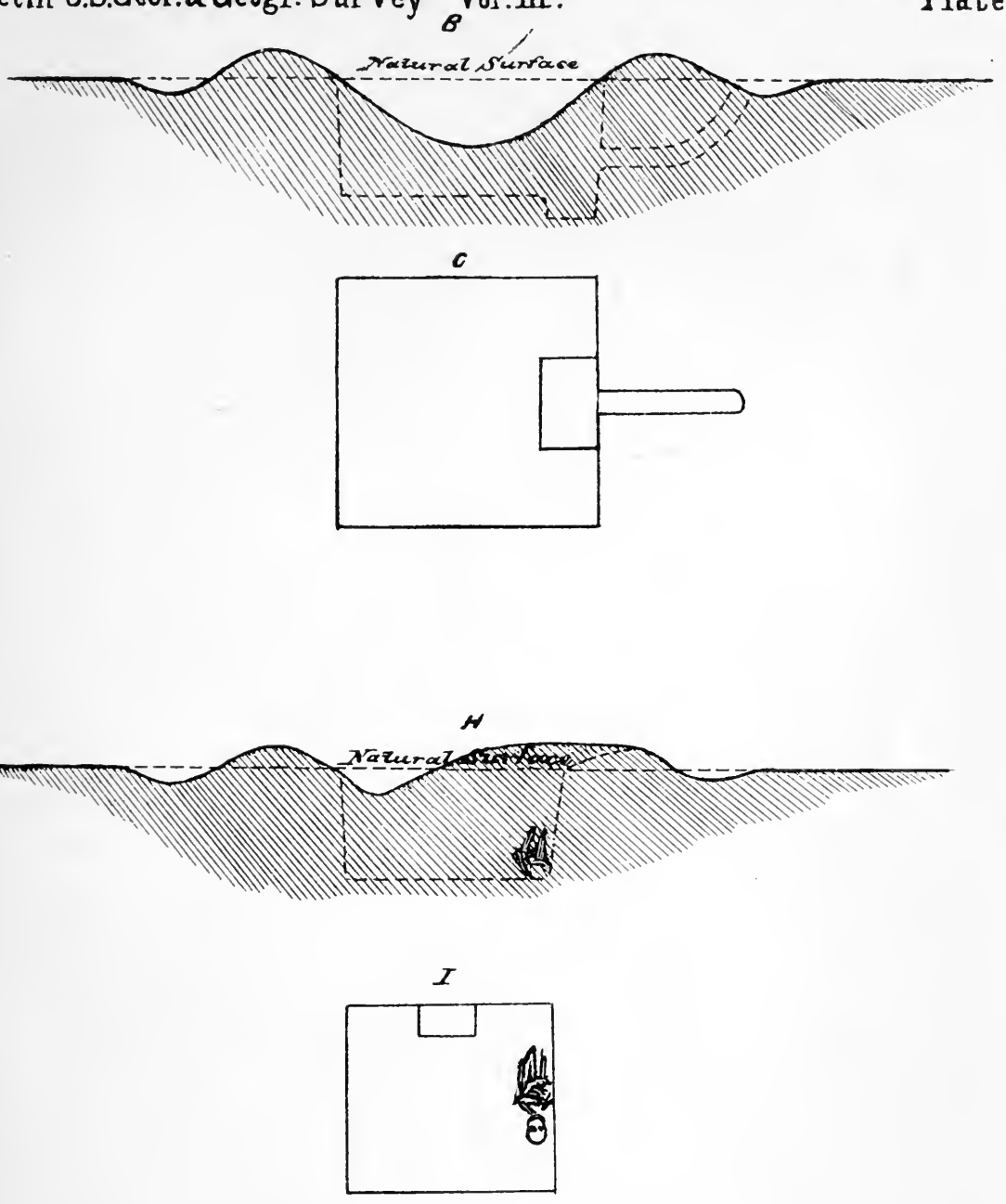
horizontally, with a fireplace in the center. The excavation is reached by a notched board, after entering the house through a circular door near the ground. The remains of the square structures of the Tu-tu-to-ni show, as at the Klamath, the marks of an ax, while the wooden parts of the older circular ones are charred at the ends and split with elkhorn wedges, of which we find so many among the *débris*.

In one of the ruins we excavated on the main *rancheria* was found a boat-shaped vessel, or dish, about nine inches in length, made, like those of our collection obtained on the islands of Santa Barbara Channel, of magnesian mica, showing also strong marks of having been exposed to fire, seemingly for the purpose of cooking food in it; furthermore, a beautiful ladle of stone, a nicely finished wedge of slate as used for repairing canoes; and among the kjökkenmöddings we dug over, arrowheads and knives of stone, and many bone-carvings, were uncovered.

I cannot account for our utter failure in finding any skeletons in the main *rancheria* (the ground being well adapted for graves), either in a regular cemetery or buried in houses, as we gave our attention to both modes of interment. A cemetery probably existed in front of the *rancheria*, near the brink, where the kjökkenmöddings steeply descend to the edge of the river, which had, since the depopulation of the *rancheria*, risen very high, and nearly reached the top of the kitchenmiddings, according to the mark set by the present owner of the place, and washed away a large part of the refuse.

About two miles up the river from the main settlement, another *rancheria* existed, in a nice spot, sheltered by a ridge, and bordered on one side by a small stream at the foot of a steep rising, while in front the beautiful Rogue River displays its picturesque scenes (Map 3) [Plate 6]. The kjökkenmöddings average here a depth of two feet only. While searching for the burying-ground, we sunk many test-holes all over the place, and finally came upon a grave. It was dug three feet into a sandy soil; the sides of the lower part were lined with boards; the skeleton, doubled up in the usual manner, was resting on its back, facing the east, and was covered by a board secured by several stones, and the hole filled even with the surface of the surrounding ground. Nothing was found with the skeleton.

Rogue River was alive with trout and thickly stocked with salmon at the time of our visit; hundreds of them could be seen splashing at short intervals on the surface of the water, or resting motionless in the deep eddies near rocks and bluffs. In front of the lower or main settlement are several rocks above water, of which the farthest one out was the principal fishery of the Tu-tu-to-ni, and gave rise, it is said, to many disputes and quarrels. The rock is but eight feet above the surface of the river at common height, which elevation is well adapted for the spearing of fish by torch-light; the torch was placed in a crevice near the water-mark of the rock's face to attract the fish from out the deep holes near enough to the surface to be in easy reach of the expert spearsman.



Sketches, plan and section of excavation at Tu-tu-toni and Chĕtl-ē-skin Rancherias

As the adjoining country of the Rogue River is also an excellent hunting-ground, of course the favorable places along its banks had been settled by Indians. This is demonstrated by several deserted camps, formerly inhabited by the *Me-ka-nē-ten*, before the mouth of the Illinois River is reached, where the main tribe of the *Shis-ta-kūs-ta* dwelt. On both banks of the mouth of the Rogue River were the *Yā-sut* stationed. That place is now obliterated by buildings and improvements.

While at Rogue River, the weather had become threatening, and rain set in on the morning of October 17 while we were finishing our preparations to move down to Pistol River. It was tedious, disagreeable work that day: the miserable trails had become slippery, and in consequence almost impassable even for our mules, which showed much opposition to carry a heavy load, made more so by a soaking rain. But all went on as well as could be expected under such disadvantageous circumstances, thanks to our experienced packers, until dark night set in, when we neared the roaring ocean, where the trail, almost at our destination, trends down a steep bluff, and passes at its base over bowlders; there our animals became terrified by a loose pack to such a degree that nothing could check them, and they darted off in a full stampede, scattering the packs along the beach. This caused us considerable trouble during the rainy night in searching for and removing the stuff out of the reach of high tide.

The next day we established our camp, and began excavations at the main *rancheria* of the *Chĕtl-ĕ-shĭn* on the elevated ground at the last bend, near the mouth and north of the stream called Pistol River (Map 4) [Plate 7].

The tribe of the Chetl-e-shin once occupied the country between Cape Sebastian in the north and Mack's Arch in the south, a very prominent arch-rock lying about a mile to the southwest of Crook's Point, and nearly as far from the shore—in all about eight miles in a straight line southward of Cape Sebastian. Almost opposite of Mack's Arch, from which the tribe received its name (*Chĕtl-ĕ-shĭn*, meaning *big rock*, as I was informed by a Chetko Indian), are found the extensive remains of their southernmost village. The next important one going north is at Crook's Point, a minor one at the eddy of the Pistol River, whence the stream runs parallel with the ocean beach for about a half mile to its outlet, where the main settlement is located. To the north of Cape Sebastian was the hunting-ground of the Ya-sut, having had their main station on both banks at the mouth of Rogue River, as already mentioned. South of Mack's Arch, the range commences which was formerly claimed by the *Khust-e-nēt*.

There are still visible at the main station of the Chetl-e-shin about fifty depressions of former houses, some of them obliterated by others of a subsequent occupation, and others again filled in by the Indians as if on purpose, and not by the action of time. After considerable work was done in searching for a cemetery, but without the desired result, we

again resorted to the house-sites, and especially to those filled up by human hands, which was proven to be a fact by finding human skeletons interred at the bottom of the excavation. The corpses were found without exception in the subterranean part of the ruined houses, which were here like those at Rogue River in size and wooden linings, but without the draft-passages for the smoke to escape. Doubled up, the skeletons were resting near the wall of the excavation, and faced the fireplace, as indicated in sketches (H and I) [Plate 4], which part was the most deeply covered with earth, whereby the remaining surface-indentation of such a house-site was easily discernible by an enlarged embankment, in contrast to those which were not shaped through a burial, but had adopted the form of an inverted mole-hill by the natural action of filling-up, caused by time and the elements. In one instance, two skeletons were found buried in one house, where a re-opening seemed to be evident by the flattened and unusually enlarged covering earthwork. Such a singular indentation in which a burial was made will be better understood by comparing the section diagram (H) [Plate 4] with that of a common formation (B) [Plate 4], in which latter no burial had occurred. The earth covering the skeletons was strongly mixed with charcoal, pieces of charred wood, fragments of animal bones, and shells blackened and partially consumed by fire. On the floor on which the skeletons rested was found a layer of ashes of several inches in thickness. But the fire had not affected the skeletons, as in no instance was any such damage observed, and even the remains of matting, furs, and other similar perishable material were not injured by it. It seems, therefore, evident that the hut was demolished by fire, after the owner had expired, and was buried in the ruins, covered with rubbish and earth surrounding his house. Except some glass beads found with a female skull, and three roughly-cast copper buttons with that of a male, nothing was unearthed that had apparently been deposited with the dead. Of course, in the mass of *débris* we worked over, divers articles were found, but not in such a position as to indicate an intended deposit of property of the dead in accordance with a religious or superstitious rite.

We find another large shell-mound located on loose sand about four hundred yards northward from the main settlement, where all the characteristic indications of a permanent settlement are noticed, excepting the house-sites, which likely had become filled up and obliterated by the sand drifts to which this place is exposed, as well as by the heavy rains during the winter. A stream of water passes the base of the dune, but disappears in the sandy beach. Back of the shell-mound, the ground rises gradually for a distance before it reaches the foot of a steep ridge extending back from the shore, and defining the lower boundary of an almost impenetrable country by its rough topography, its forests, and dense growth of underwood, the safe home of all kinds of game, panther, and bear. A few hundred yards up the coast from the shell-mound, near

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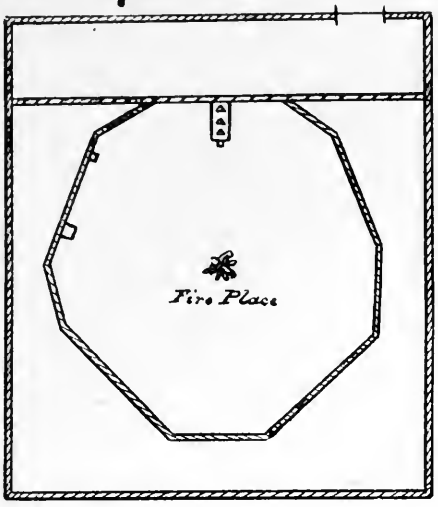

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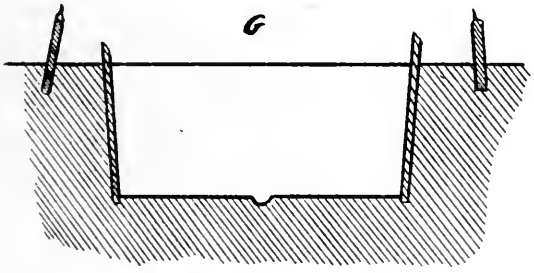

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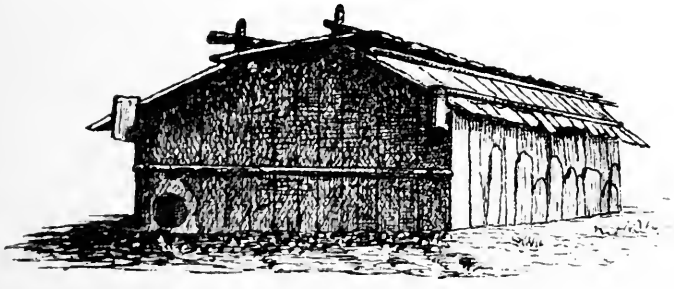

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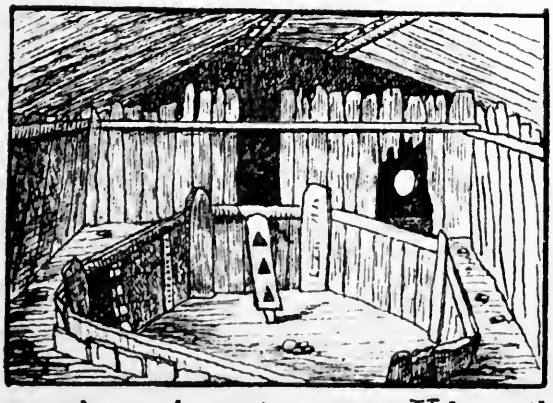


Sketches, plan and section of present Klamath dwelling.

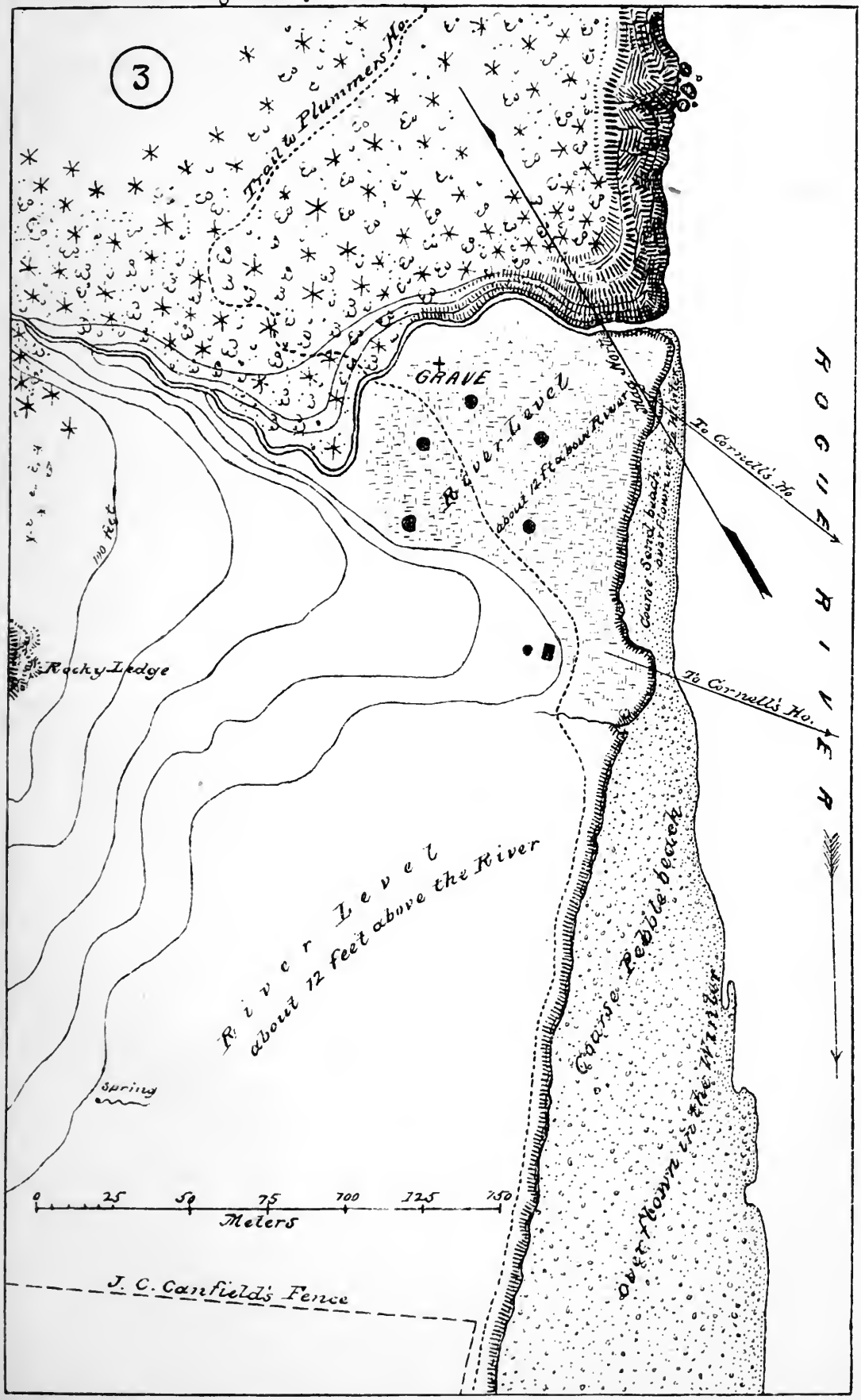
the bluff, we find indications of several house-sites, and much decayed shells and animal bones, mixed with sandy soil, producing that peculiar ash-like appearance. Neither at this place nor at the shell-mound did we discover any skeletons; and only a small addition to our collection was obtained in surface findings. In the right bank of the Pistol River, on the elevated bluff running parallel with the ocean beach, several small shell-mounds were met with; as also on the bare dunes across the river, &c.; but of these I have spoken in the Smithsonian Report of 1873.

At Pistol River, we were detained for several days by heavy rain, during which time I made a trip ten miles (by the trail) down the coast, to a place known as Hustenate, where the old *rancheria* of the *Khust-enēte* is located (Map 5) [Plate 8]. Here the well-defined cemetery was readily found. Mack's Arch is the northern boundary of the Khust-enēte, and Whale's Head, a prominent landmark on the ocean shore, about eight miles southward, is the southern boundary, whence the territory formerly occupied by the Chetkos extends southward. The next day we moved a light camp to Hustenate over a very rough trail, and reached that place in a heavy fall of rain of a winter storm just setting in. During the night, our tent was blown down, and shelter had to be sought for in a small shanty open to rain and wind. The location of the *rancheria* is sheltered toward the south by a rise and outreaching bluffs, while back of it, and to the northward, the ground rises rapidly, leaving a steep opening, from which issues a creek of considerable volume, which was much swollen by the rains at the time of our visit. The ground on which the *rancheria* is located has been disturbed by many slides, some of which evidently occurred since the place was abandoned by the Indians. Decayed shells and bones, mixed with sand brought up from the beach, a mass of vegetable mold and rubbish, and all sizes of beach-stone, constitute the compost of the surface-layer to a depth of two to five feet, below which dark humus is found, over a soft slaty formation of a grayish color, which is coal-bearing. The house-sites are, as usual, irregularly located over a space of a hundred yards in length and something less in width. Considering the condition of the ground upon which we find the aboriginal settlements on the Oregonian coast visited by our expedition, the opinion I have expressed in my previous report of such settlements on the southern coast of California holds good for this locality also: that all such stations had been established either on sandy ground, or that the nature of the ground had been artificially changed by layers of sand carried thither when it was rocky or hard. Sandy soil was necessary to the rude and imperfect tools for the erection of houses, which were partially dug in the ground, and surrounded by embankments. It was also a requirement for cleanliness, and healthful through its absorption of moisture in rainy seasons. About fifteen feet from the creek as well as from the shore, and but fifteen to twenty feet above the sea, are two rows of graves, dug in dark, coarse soil, bare of shells and sand, each grave being distinct one from another. On digging, the graves were found to be

very shallow, the skeletons being interred but one and a half to two feet below the surface. The sides of the excavations were lined with split redwood boards, about four feet in length and a foot in width, placed edgewise, and reaching to the floor of the grave, which was covered with beach-sand to the thickness of about one inch; the width was not over two feet, and both ends of the excavation were open, that is to say, without lining. The corpses were found doubled up in the usual manner, lying on their backs, or sideways, and facing the *rancheria* in a southeastward direction, although some were found just in an opposite way. Immediately above the body was placed a board resting on the lining, to which it was secured by cobble-stones of various sizes, some weighing as much as fifty pounds. The grave was then filled up with earth, and covered with another wide board to an even level with the surface, and probably, if we trust the remains of a few redwood stakes in close proximity to the grave, was also fenced in. I entertain no doubt that the worldly goods of those buried here, of which we did not find anything in the graves (excepting a few money-shells and glass beads), were placed on the top-board of the grave, a custom made evident by the habits of the present Klamath Indians. I lay before the reader a grave of the last-named tribe (Sketch K) [Plate 8], and give also a plan (L) [same plate], with some tools placed on the top-board, as copied in their *rancheria* at the mouth of the Klamath River, which might be well accepted as the restoration of a Khust-e-nēte grave, of which but the surface-board remained, while time and elements annihilated a part of the articles deposited over the grave, and casual visitors destroyed and carried away the rest. With babies' skeletons, and a young woman's corpse, we found some much-decayed money-shells (*Dentalium entalis*), which served to ornament the living, and were probably intended as a means for the frail little ones to pay the ferryman of the Indian Styx. A few glass beads were also found with skeletons of grown females. The shape of the skulls is remarkable for the artificial deformity, the forehead receding and the occiput protruding disproportionately.

We moved back to Pistol River in stormy weather, which increased during the following day to one of those heavy Oregon winter storms that define epochs in the chronology of the country people. Pistol River swelled rapidly, and overflowed most of the valley near its mouth. Large tracts of the river-bank were washed away, and countless trees, among them gigantic spruces, were seen floating in rapid drifts to sea or ramming in at some bend of the river, soon forming floating islands. The stream being impassable even with a boat, it took five days before we ventured to cross with the pack-train on our way to Chetko; which place, 30 miles distant by trail, we reached after two days, as the trails were bad and much obstructed by fallen timber.

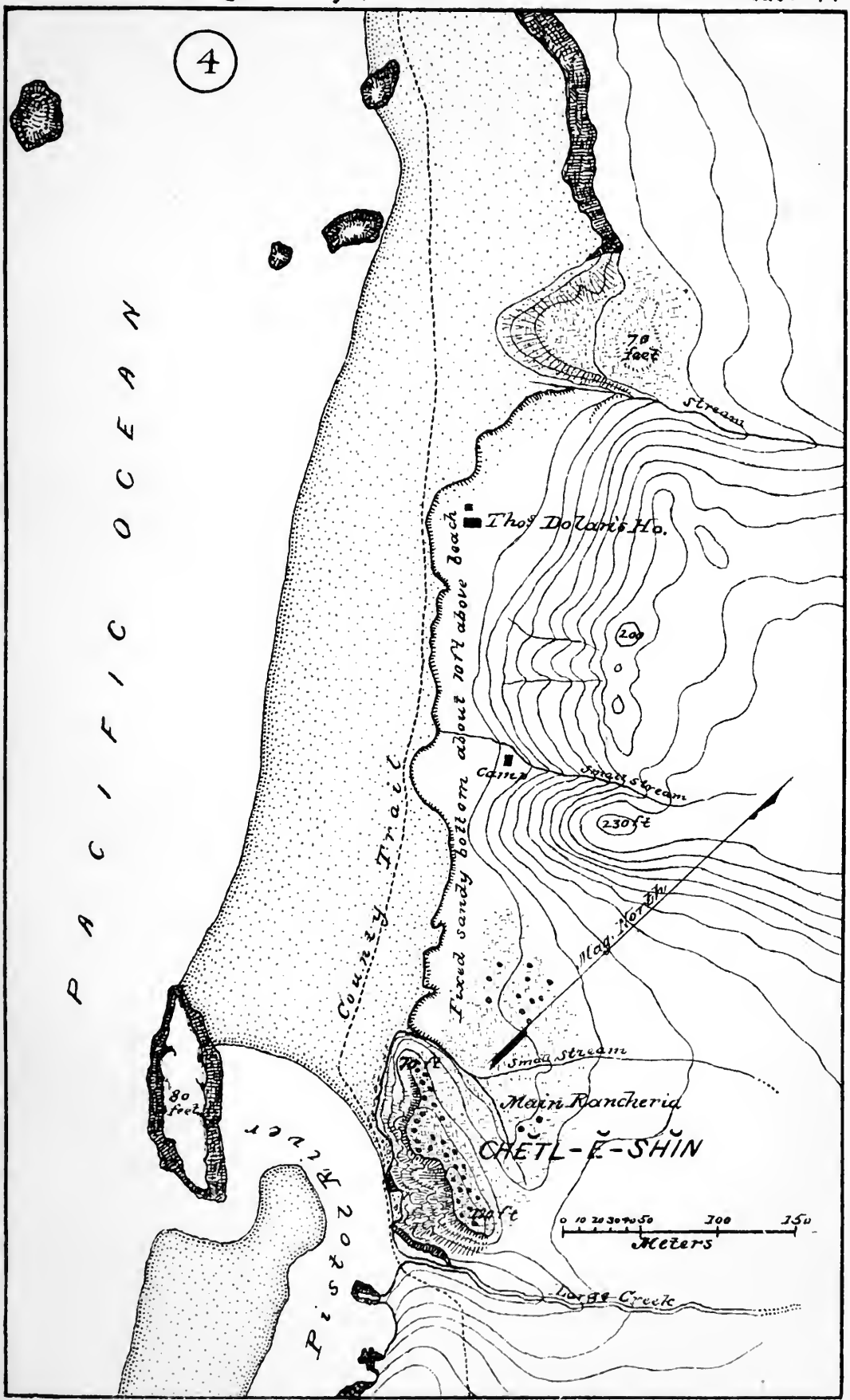
At the mouth of Chetko River we opened eleven graves, and found the dead buried in the same manner as noticed at Kustenēte; only that



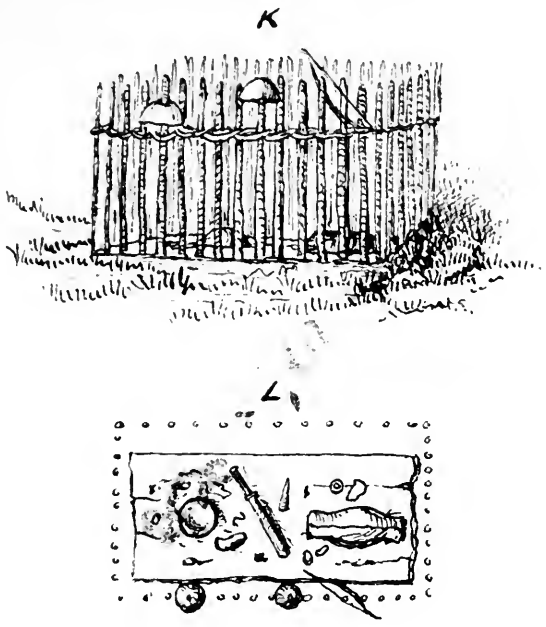
Map of Rancheria and Vicinity near main Settlement on Rogue River.

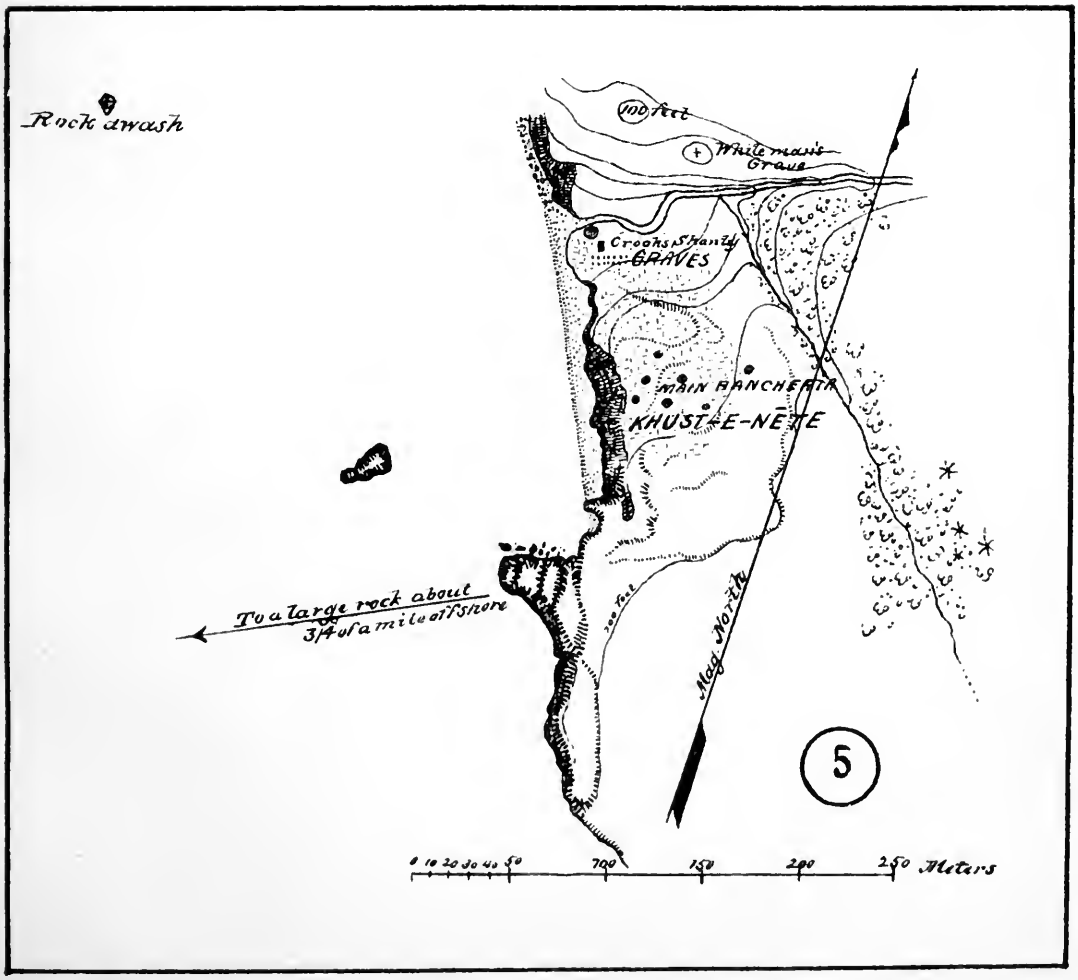
each grave was, in addition, marked with a small heap of beach-worn rocks, whereby its location was easily recognized. Nothing was found buried with the dead, though several articles were discovered among the rubbish. The graves were located about 20 yards northwestward of those described in the Smithsonian Report of 1873.

From Chetko we moved, on the 4th of November, our camp-equipage and collection down to Crescent City for shipment with the first schooner. The steamboat connection between this place and San Francisco had already ceased for the winter, and we were compelled, as no schooner was at anchor and none soon expected, to go overland to Humboldt Bay, and thence by steamer to San Francisco.



Map of the main Rancheria of the Chĕtl ĕ shin and vicinity near the mouth of Pistol River.





Map of Rancheria of the Khust-e-nēte at Hustenate.

ART. III.—RESEARCHES IN THE KJÖKKENMÖDDINGS AND GRAVES OF A FORMER POPULATION OF THE SANTA BARBARA ISLANDS AND THE ADJACENT MAINLAND.*

By Paul Schumacher.

Plates 9–22.

In compliance with instructions from the Smithsonian Institution, given April 11, 1875, I at once made preparations for the early start of an expedition to Southern California, to the group of islands in the Santa Barbara Channel and the neighboring mainland (Map 1) [Plate 9]. The principal aim of the expedition to this region was the collection of implements left by the former inhabitants, the observation of particulars in connection with such finds, the description of the mode of burial practiced by these people, and the delineation of topographical characteristics, together with the preparation of sketches of such former settlements.

With three hired men and a camp-outfit, I left San Francisco on May the 4th, on board of the United States revenue-cutter Richard Rush, Captain Baker. On the following day, we were landed on the island of San Miguel (Map 2) [Plate 10], the most western of the group in Santa Barbara Channel, and seeming to be a barren bank of sand rising from the ocean when approached from the northwest. From the northern bold point to the eastern end, with the exception of a break formed by Cuyler Harbor, the shores are rocky and high; and from here along the southern side, toward the low, sandy west end, a smooth ridge, about 500 feet high, abruptly ends in a bold shore-line. On the north side this brown, dry, and dusty-appearing elevation slopes steeply, and is arrested by immense dunes of drifting sand, which extend from the west end in innumerable ridges of most varied formation, and nearly half the width of the island, to the north point. Sand driven by northwest winds is drifting into the bay, which is being gradually filled in at its northwest side, where the dunes descend in a steep decline to the water's edge, and their base is washed by the ocean. At the entrance of the neat little bay, in which vessels may find good anchorage and shelter lies an islet, and between it and the eastern end of the bay extends a reef, over which heavy swells usually break, leaving a channel between the rocky islet and the western terminus of the harbor.

[* See note to Art. II, p. 27. A portion of this paper was published in a German periodical (*Archiv für Anthropologie*, vol. viii, p. 223). The descriptions are mainly topographical, rather than archæological.—Ed.]

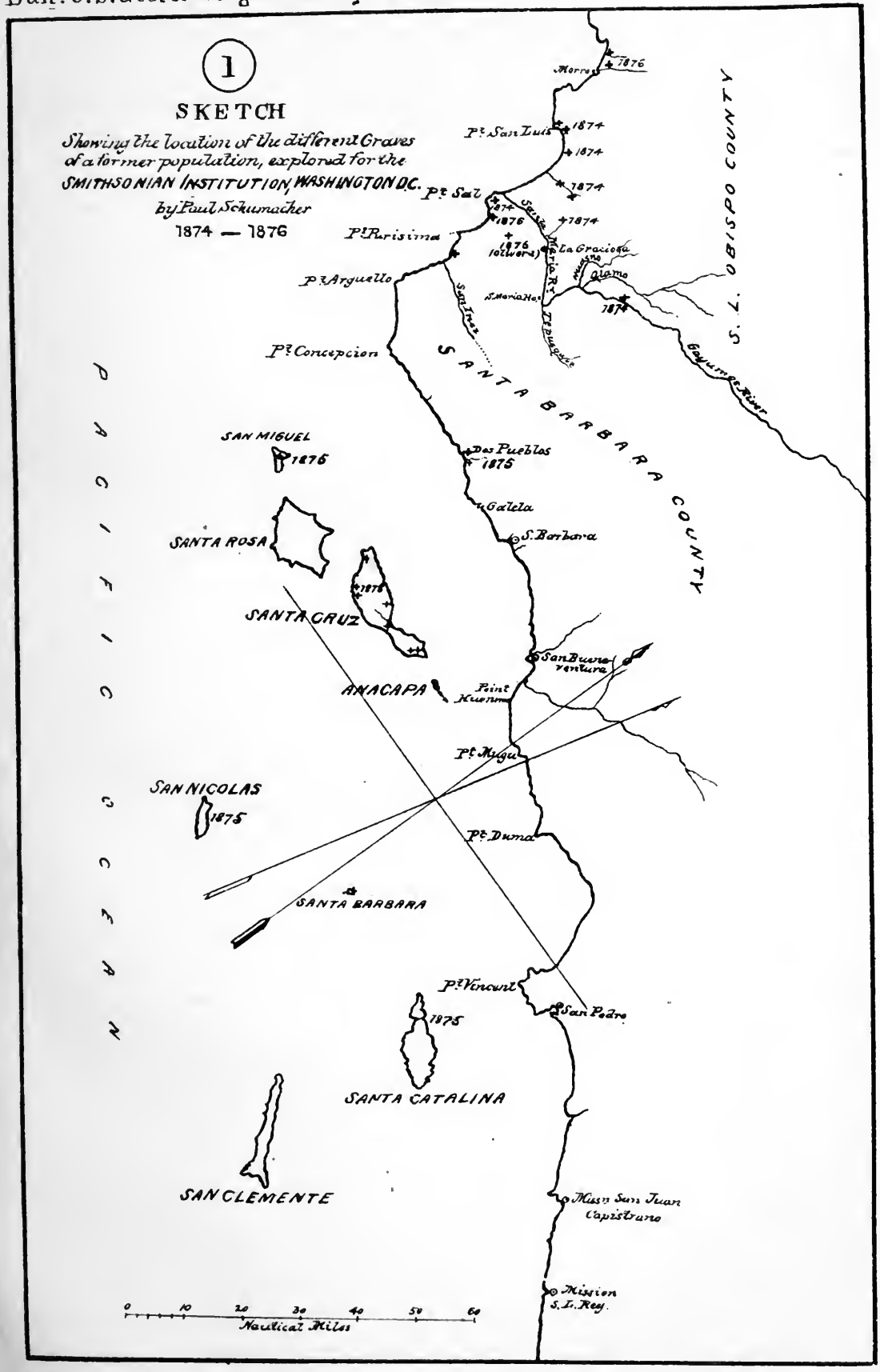
On San Miguel Island are two small perennial springs; one is situated several hundred yards below the *adobe* building at the bay, and the other, with a little better quality of water, on the elevated northern point.

The vegetation consists of low bushes, cactus, and grass, but no trees. At our visit, the island, which is a Government possession, was "dried up", being overstocked with starving sheep.

With much difficulty we moved our camp through the shifting sand up the western shore of Cuyler Harbor, where the best boat-landing is offered, and found there on shell-mounds room enough to erect our tents.

The kitchen-middings, or kjökkenmöddings, of a former people are found all over the island where sandy ground is met with. This singular mixture of all kinds of shells, bones, rocks, and flint-chips, spread usually over a space of about a hundred yards square, and to a depth of five feet, although the extent and depth of such shell deposits vary greatly, is found on both sides of the harbor, especially over its northern point, also along the northwest side to the west end, and covers in great masses the low, sandy, western extremity of the island. The deposits of the kjökkenmöddings are much exposed to the strong northwest wind, and, as they are located on loose sand, are laid bare by its action, offering therefore good facilities for surface collections. But of these the casual visitors to the island, mostly persons interested in stock-raising, excursionists, and amateur curiosity-hunters, have picked up or destroyed the best, and much of what was left had been collected several months previously to our visit by Mr. Dall, of the United States Coast Survey, during a short visit to this island. Of the small surface collection made here, I consider an unfinished mortar the most interesting article, showing in its partially rough and incomplete state the mode of manufacturing such a utensil by the aborigines. But my attention was especially given to the finding and exhuming of the old cemeteries, which, as my experience taught me, promises the richest reward. About half-way, and almost in a line between the two springs, near Cuyler Harbor, I found a grave-yard, and soon another close by, which yielded about 250 skeletons, and many utensils, implements, and ornaments of stone, bone, and shell. Not far from the upper spring, another burial-place was discovered, which hardly returned any results.

The mode of burying was similar to that previously observed on the mainland, on the coast of California, which I described in the Smithsonian Report of 1874. The bodies were buried in the kjökkenmöddings, because the kitchen-refuse offered here the only ground which is firm enough to resist caving, and also to prevent the winds from uncovering the dead, as would occur with loose sand. The skeletons were found from three to six feet under ground, and often from three to four resting one above the other, separated, if at all, by the bones of the whale. The bodies were deposited without any order as to position and direction of



Map of Islands in the Santa Barbara Channel, and neighboring mainland.

the face, being sometimes found face downward, lying on one side, or on the back, or face to face, or crosswise, and the bones in nine cases out of ten disturbed and displaced. This confirms my former opinion that the graves had been re-opened, and the bones disarranged while fresh bodies were being added. The bodies lay so closely together that at first, they seemed to have been the victims of a fierce battle, buried promiscuously in a pit. Close observation, however, indicates that the interments were made at different times, as implements of shell and bone, skeletons, and remains of perishable partitions, often plainly show by their more or less advanced decay, and by the position in which they are found. It is likewise evident that the burial took place before the decay of the body, although such was not the custom of some interior tribes, because we found the bones of some skeletons buried the deepest, and especially such as were interred separately from the others, in perfect order. Some were even still enwrapped in matting. To find a skeleton at the bottom of a pit, at the depth of about five or six feet, especially if there be none above it, is considered by the practical digger a lucky hit, and causes him to work carefully in the removal of the slabs and whale-bones, and to look for stone-knives, spear-points, or strange stone implements, as it is supposed to be either the grave of a warrior, a chief, or a "medicine-man".

While on this island, we were much exposed to the grinding sand, driven in our faces like so much hail by a brisk northwest wind that lasted day and night during our four days' stay. The preparation of food at an open fire became impossible, and most of our provisions were thickly coated with sand. Although we could have secured a boat belonging to the schooner Matinee, then in port, attending to the wants of a number of shearers and awaiting a cargo of wool, a visit to the northwest and west ends of this island was prevented by a heavy sea, which made a landing impossible. Our party left on May 9, on the beforementioned schooner, and landed in Prisoner Harbor on the island of Santa Cruz.

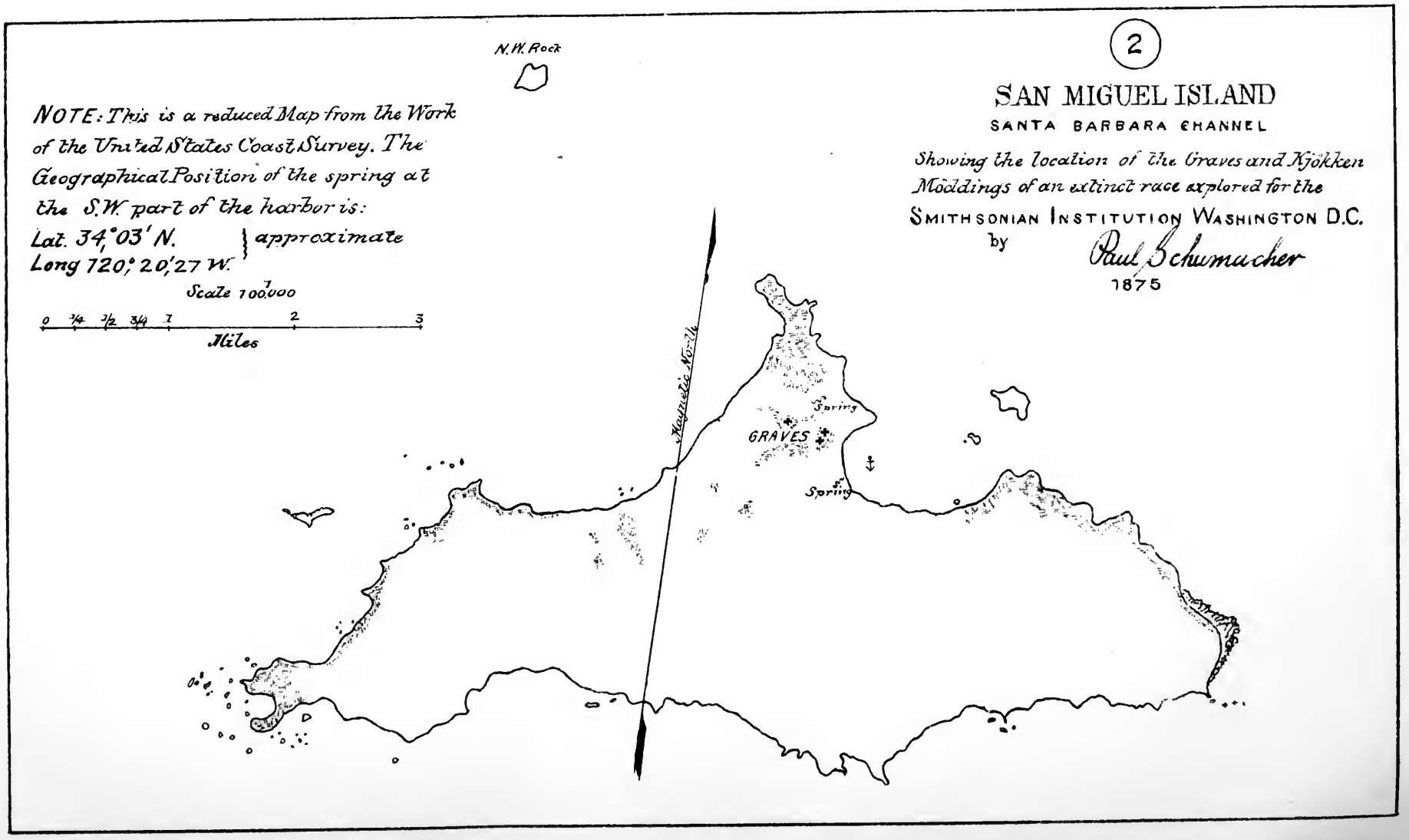
Santa Cruz (Map 3) [Plate 11] is probably the prettiest island of the group; in picturesqueness it equals and in vegetation excels Santa Catalina. It is mountainous, with large stretches of rolling land, especially near the eastern and the western ends, where fine valleys, picturesque bluffs, and ravines occur. It is, according to the works of the United States Coast Survey, 22½ miles long, running almost due east and west, and from 1¾ to 6½ miles wide. Its greatest height is 1,700 feet. It has a fair shelter in Prisoner Harbor and in several places along the east, south, and west sides, such as Smuggler's Cove, Coche Prieto, Forney's Cove, and others. There is good water in the different springs and creeks found all over the island the year round. Timber is found in many places, and quite extensive groves of conifers occur west of Prisoner Harbor, while stunted oak-trees grow on the high rocky hills and sides of the steep gulches, and low willows in the cañons. It

is owned by the Santa Cruz Island Wool Growing Company. Near a good wharf at Prisoner Harbor stands a substantial *adobe* building, and back of it extends a beautiful valley, about 8 miles in length, which afforded us, near its mouth and on the banks of a running stream under old oaks, an excellent camping-ground.

Our party spent about one month, from May 10 to June 12, on this island, during which time we made explorations all along its shores 65 miles in extent. Here we found the United States Coast Survey steamer Hassler, Captain Taylor, engaged in making soundings round the island; and as the Superintendent of the United States Coast Survey, Capt. C. P. Patterson, in view of the fact that the expedition was made at the expense of the Government, gave permission for the transport of our party to such places as lay in the route of sailing of the courteous and obliging Hassler party, it gave us a great advantage in prosecuting our work, and saved much expense in sparing the necessity of chartering a vessel or hiring pack-animals.

Our main attention was again directed to the finding and examining of graves. From our camp at Prisoner Harbor we made trips to different places on the island, taking only the necessary provisions, water, and blankets along with us. We also carried some boxes in shooks, in which temporarily to pack our finds.

Our first station was at Tinker's Cove (Map 4) [Plate 12], a narrow fiord-like shelter for small craft only, with high walls on both sides that seem to exclude all possibility of a farther advance. Proceeding from our temporary camp among the rocks near the sand beach of Tinker's Cove, we climbed the western face of the gorge, and approached the shell deposits first observed while passing on our way from San Miguel Island to Prisoner Harbor. We found the kjökkenmöddings located on a plane about 50 feet above the sea, which is arrested a little ways from shore by a steep ascent with rocky outcroppings. The ground is rocky, and terminates at the beach in an apron of horizontal stratification, washed by the ocean, and, at low water, quantities of eatable mollusks can be gathered. Two hundred yards to the westward, on the bight of a shelter similar to Tinker's Cove, but with an inferior landing, is a small spring supplying drinkable water. Great masses of kelp exist in the adjoining inlet and among the outlying rocks (of which but one appears on the map), where we may watch the motions of a great number of seals and sea-lions in catching fish, very abundant in these waters. One of the two burying-grounds discovered here was still well marked with whale-bones above the ground, probably not so conspicuous as shown in the sketch (A) [Plate 21] for the sake of illustration. Both were in the deposits of the accumulated kitchen-refuse, as the surrounding bottom below its shallow subsoil was impenetrable for the tools of these people. In the arrangement of the graves, nothing was observed that materially differed from those on San Miguel. We only found here more wood in the walling-up of the graves and more char-



Map of San Miguel Island.

coal among the *débris*. The graves yielded about 225 skeletons and a moderate addition to our collection in stone and bone articles. From this place we made a reconnaissance in the surrounding country, and noticed many shell-mounds located, rather singularly, on high ridges and mountains, where water is distant and the place bare and much exposed. The shells on such places are better preserved, and it seems as if these people had moved up here the better to avoid contact with the whites while hunting otters around these islands. The deposits, although very conspicuous by their bright color when seen from the sea, and scattered over large areas, are not deep, and we found but very few flints, some beach-rocks, but no skeletons, and therefore they may be safely termed temporary camping-grounds, as described in the Smithsonian Report of 1874. After almost a week's stay in our picturesque camp, the passing Hassler party took us up and brought us back to Prisoner Harbor.

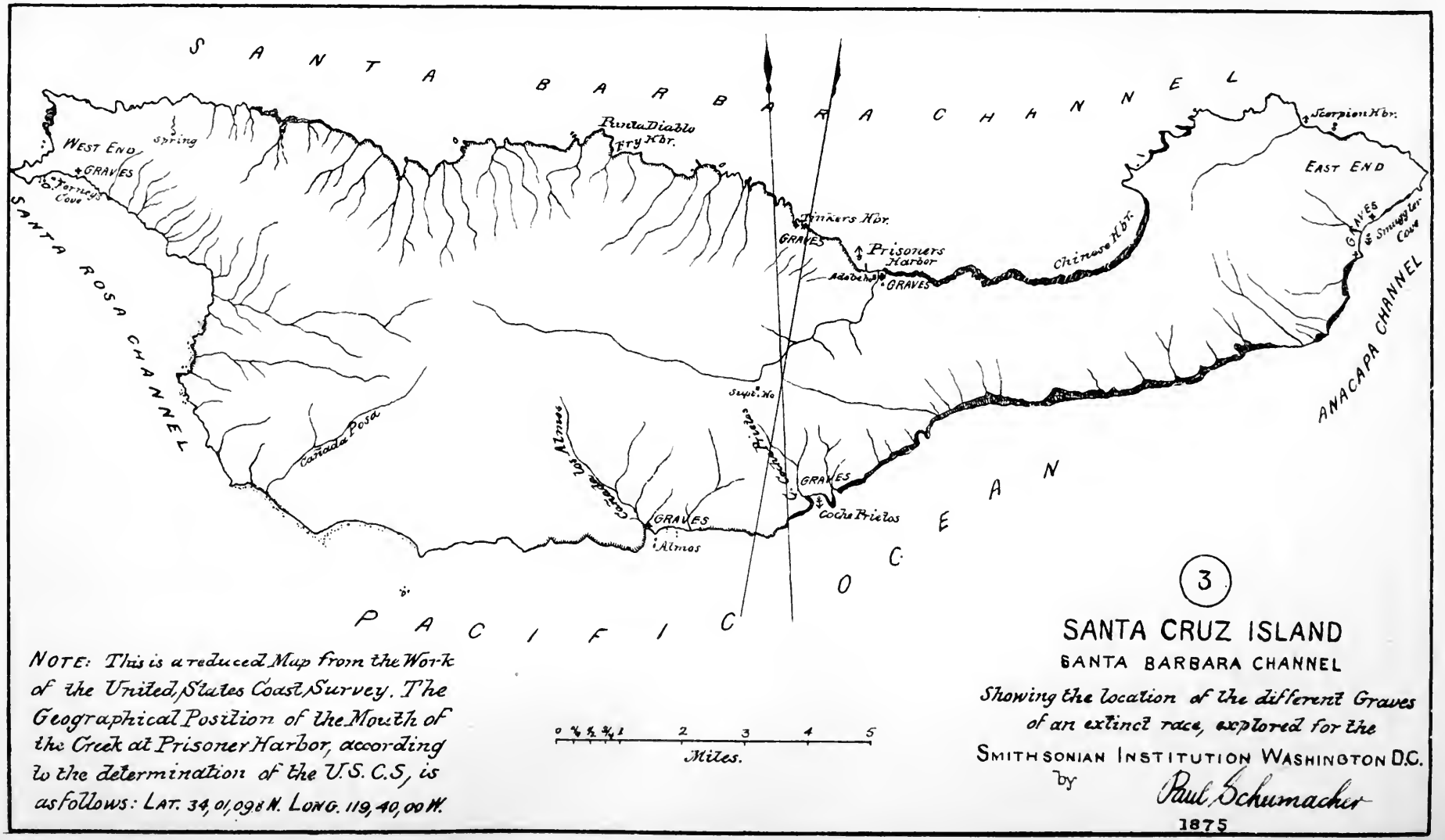
We intended to make our next station at Smuggler's Cove, but the heavy breakers prevented us from landing, and we went on to Coche Prieto (Map 5) [Plate 13], a small cove on the south side of the island, of which Prisoner Harbor lies due north across the neck of the island. We found shell-mounds at the mouth of a dry creek ascending gradually toward the east side of the cañon, while an older layer was found opposite on the west side, or the right bank of the creek. Here again, as in fact all over the island, with but one exception, the reason of digging the graves into the kjökkenmöddings, was the difficulty of working the ground which surrounds them, as only the beach is sandy, while back of it the bottom is gravelly and the rising ground hard and rocky. The western cemetery was the larger one; but, although we exhumed 140 skeletons, we made only a moderate addition to our collection of ethnological finds. The first fish-hooks of shells were found in the graves eastward on the small ridge. They are ingeniously made, and I shall speak of them more explicitly farther on. We dug up a square board (*a*) [Plate 22], about 1½ by 2 feet, pretty well preserved, painted with a bright red color, and having small indentations in a depression which is bounded by a raised border. I was told by an old *vaquero*, with some Indian blood, that the board was used in connection with hot ashes to whiten the money-shell (*Olivella biplicata*) by a sieve-like action. The same individual explained the use of a perforated stone (*b*) [Plate 22], commonly found, and so readily taken for a war-club head, as a weight to the shaft of the wooden spade. If one is at the first glance inclined to take this implement as the ball of a club, we also must admit the fact that we found many of them split in two, as if caused by the wedge-like action of the spade-handle, and that no stone spades were found, which speaks in favor of the theory that it was used for the purpose stated by the half-breed, who was very positive, and earnestly tried to impress on us the idea by roughly making the implement used by his ancestors as a spade. We also found some wooden relics, which appeared to me to have belonged to a canoe, made of board sewed with strings, and well

painted with asphaltum. But, in the opinion of the *vaquero*, it was a part of a cradle. I may add here that the same half-breed assured me that he was present, some forty years ago, when the last few Indians were taken from their *rancheria* at Prisoner Harbor to Santa Barbara by the missionaries.

After two days' stay, we returned again to Prisoner Harbor. The next few days we spent in properly packing our collection made thus far on Santa Cruz Island, and also in examining the shell-mound located on the right bank of the stream, at its mouth, and where it forms a small fresh-water pond, or lagoon, before disappearing in the loose sand. Avoiding carefully the last resting-place of a sailor buried here some years ago, we found the graves a little south of the supposed astronomical station of the United States Coast Survey. Here we dug up about 40 skeletons, but hardly any implements, except 14 finely-made fish-hooks with barbs, some of bone and some of shells; also some of the tools and many flakes of shells required for the manufacture of such hooks.

Joining again the Hassler party on their way to the south side of the island, we made a landing in a small cove designated as Los Alamos (Map 6) [Plate 14]. This place is very much the same in appearance, location of the mound, and of the two graves, as that at Coche Prieto. The returns were poor, although we unearthed about 100 skeletons. I will mention a piece of fishing-tackle, which was here, as on previous occasions, repeatedly found in connection with fish-hooks and bone fish-spears. It is a piece of a bright shell, varying, say from 2 to 4 inches in its longest measurement, differing in shape, but similar to the design (*c*) [Plate 22], which was fastened at the end of a line, and used, I am convinced by observations in exhuming it and by the explanations of old Mexicans and Indians, to attract the fish somewhat as in our present mode of trolling with a "spoon-hook".

Next morning we again undertook to land at Smuggler's Cove (Map 7) Plate 15], near the east end, and this time with success, although the utmost skill of the officer in the boat was required to avoid an accident. Here we readily found the cemetery on the gradual ascent of the left bank of the creek, in a thicket of thorny cactus growing all over this extensive shell-heap. Among the articles discovered, my attention was again arrested by a deposit of shell-flakes, as first found at Coche Prieto, and afterward at Prisoner Harbor, some of which were partially worked into fish-hooks, others finished. Other kinds of implements were found, such as double-pointed borers, of coarse, gritty sandstone, flint points, and a whetstone shaped something like a double-edged knife. All of these kinds of articles had been found before, but never such a full assortment in one place. I had before suspected that these objects were used in the manufacture of fish-hooks. I now was convinced of it, and as the tools comprise a complete set, I will illustrate them with several figures taken from the originals, which will be found among the



NOTE: This is a reduced Map from the Work of the United States Coast Survey. The Geographical Position of the Mouth of the Creek at Prisoner Harbor, according to the determination of the U.S. C.S, is as follows: LAT. 34, 01, 09.8 N. LONG. 119, 40, 00 W.

(3)

SANTA CRUZ ISLAND

SANTA BARBARA CHANNEL

Showing the location of the different Graves of an extinct race, explored for the SMITHSONIAN INSTITUTION WASHINGTON D.C.

by Paul Schumacher

1875

Map of Santa Cruz Island.

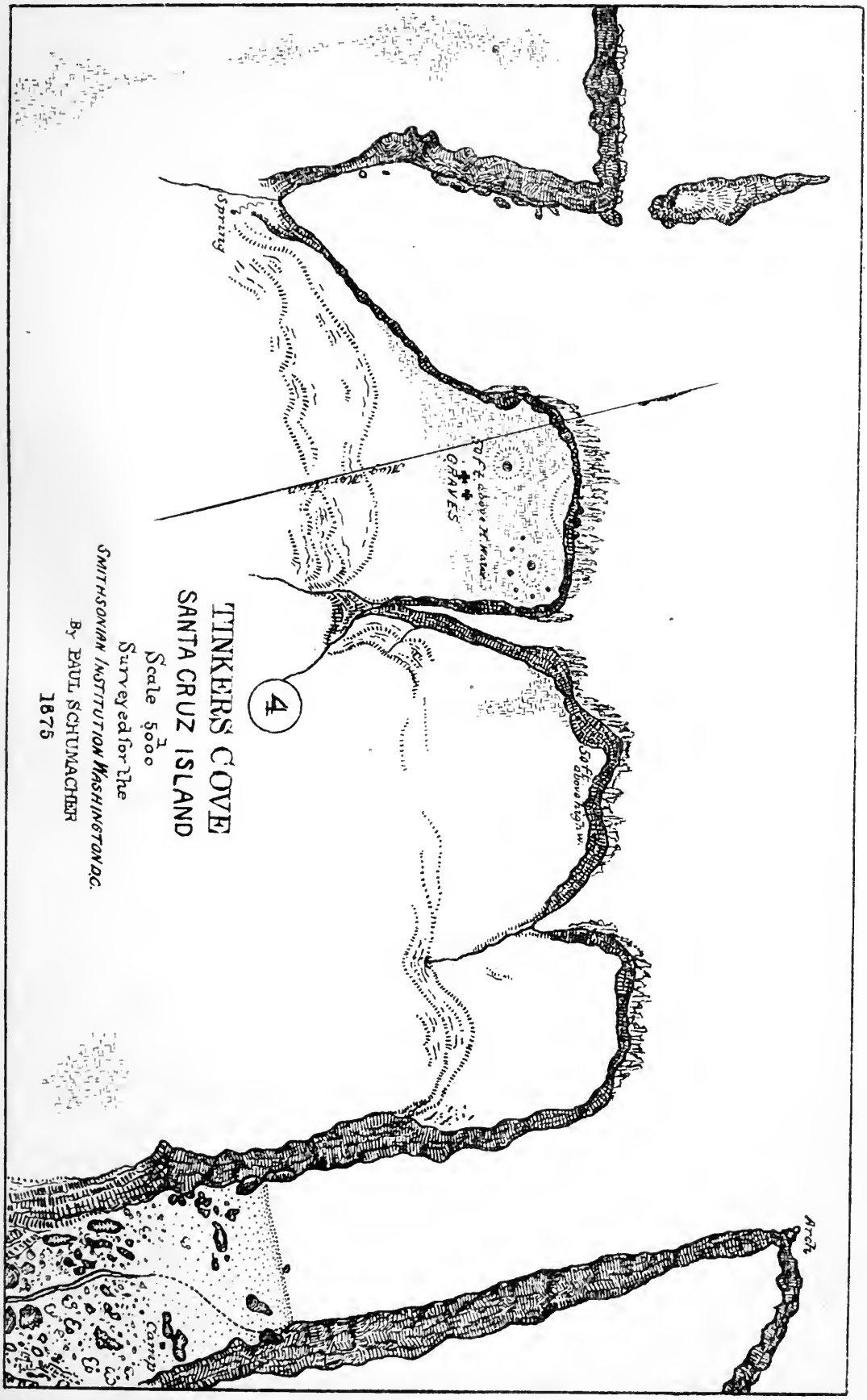
collection sent to the Smithsonian, and will describe the manufacture of the fish-hooks.* The figures *d* to *h* [Plate 22] represent the shell-flakes usually of the red-back abilone, as found in its different stages of finish, while *i* and *k* show finished hooks. The pieces were broken from the *Haliotis* shell in coarse flakes, *d*; then perforated like *e* with the flint-point *l*; the hole rounded, as shown in *f*, by the double-pointed borer of coarse, hard sandstone *m*; then its rim worked into the shape *g*, for which any flat sandstone may have been employed. This done, the knife-like whetstone *n* was required to work out the part shaded in *h*. With some additional touches, the hook *i* was finished, and fastened for use to a line, as shown in *k*. I have purposely illustrated in *k* a beautiful hook of bone, because remarkable for its barb projecting, contrary to the modern style, from the outside of the curve of the hook. The shank of this rare hook showed still a part of the line, attached in the manner as shown, thickly coated and preserved by asphaltum. [These figures are all on Plate 22.]

While the excavation was being prosecuted by experienced and careful workmen, I searched the neighborhood, and discovered at the point of the cove, which lies about three-fourths of a mile almost due south from the burying-place, unusual signs of a former settlement, and the head-stones of the graves, consisting of huge whale-bones, nearly covered up by a luxuriant growth of cactus, so omnipresent on this island. The slope of the extreme point, which ends abruptly in a high bluff, with detached rocks washed by the sea, was leveled for the better erection of the few houses. Cobble-stones had been planted in a row as an embankment, and the space filled up with earth removed from the elevated portion back of it. This afforded room for a few houses, whose former existence was still plainly indicated by the several depressions. In the graves at the point, a wooden sword of a Roman pattern was found, having its hilt richly inlaid with shells, but in such a decayed condition that it had to be thickly coated with varnish for preservation, whereby the brilliancy of color of the shells and the good appearance in general were much injured. Anything made of shells will part in flakes as soon as exposed to dry atmosphere, and is therefore easily lost, or at least disfigured. The two grave-yards at Smuggler's Cove yielded about 200 corpses and several boxes of implements.

Our last camp pitched on this island was at Forney's Cove (Map 8) [Plate 15]. Before examining this place, I entertained the hope of a rich harvest, as the shell-deposits are abundant here, and glisten on almost every eminence along the slopes, and even on the tops of the main ridge. The reef that extends from the outer end of the cove to a rock island, the singular formation of the point with its subterranean passages washed by the sea, and the rocky surroundings on all sides, with its masses of kelp and sea-weed, make this the best portion of the island as to the

*I have given a full illustrated description of the manufacture of fish-hooks in the "Archiv für Anthropologie", vol. viii, page 223 *seq.*

multitude and variety of mollusks and fishes. But as water is distant, the nearest being found only in a spring on the other side of the ridge, about two miles to the northeastward from the cave, not considering the climb, I was not surprised to find all these shell-deposits, with but two exceptions, the remaining witnesses of a temporary camp of those people who came here from the other side of the island to supply themselves with fish and mollusks. The largest shell-mound close to the cove is surrounded by a fence for a sheep-fold in the time of wool-clip, and we can no longer find any signs of houses or graves, although much of the characteristic material which stamps such places as permanent settlements, such as water-worn rocks, flint chips, whale-bones, &c., is found. About a mile's walk along the shore to the eastward, we found two shell-mounds moderate in circumference, but considerable in height. We found graves on the eastern shell-mound. They were, strange to say, dug in the sites, or depressions, of former houses, three of which contained skeletons. It seems that this shell-mound was the first deserted, and was afterward used for a burying-ground (for which the depressions of the houses suited), to the neglect of the older cemetery, which could be traced, by several remaining skeletons, near the brink of the bight adjacent to the graves. The kjökkenmöddings, as we had occasion to observe them at Tinker's Cove, Coche Prieto, Los Alamos, and especially here, appear to be located on a sand-bank built by the hands of the aborigines. If the underlying bank had been built by drifts, the winds, in connection with the adjoining sand-beach, would have caused a different shape, if not a different location, of the bank, as it occurs at the above-named places, or would leave traces of its action beyond the limits of the shell-deposits, which is not the case here. This observation was made only on settlements where the ground is rocky. About five miles to the eastward, at the mouth of Cañada del Pozo, but difficult to reach by land on account of its rough topography, is reported an extensive shell-mound, which I readily noticed from the steamer, but, as a landing is not possible at all times, we were prevented from visiting it. On the north side of the mainland, between Punta Diablo and the spring near the west end, may doubtless be found some graves among the many shell-mounds, although most of them, especially those located on high slopes, served as temporary camping-grounds. Between the two before-mentioned places, at the shore, and water-mark, a cave is reported, "filled with human bones and curious implements". I was able to trace the report to a fisherman, who pretended to have discovered the cave by accident. In consideration of the great work required to search all the indentations of a most irregular and dangerous shore at least eight miles in length, accessible only by boat, where the cliffs and innumerable cave-like recesses form such picturesque sights, and spuming, thundering spout-holes reveal hidden abysses, I thought it wise to offer a reward for his guidance to the cave, but even after I had doubled the amount, which was more than a week's good luck in fishing, he failed to put in an appearance



Map of Tinker's Cove, Santa Cruz Is!

for a passage over to the island. It may be that the cave is in existence, but as to human bones and curious things I found myself often deceived.

While at Forney's Cove, we enjoyed the visits of Dr. J. T. Rothrock, Dr. Oscar Loew, and Mr. H. W. Henshaw, all members of the scientific corps of Lieutenant Wheeler's exploring expedition. Being on their way to Los Angeles, the rendezvous for the members of that expedition, they made a close connection with the island by steamer Hassler, and having a few days' spare time, joined us in our rough camp at Forney's Cove, to observe our excavations, and also do some work themselves in their respective branches.

Returned again to Prisoner Harbor, we finished the packing of our collection, which amounted already to twenty-five large boxes, and had them properly addressed to a warehouse in San Francisco, with which arrangement for their reception had previously been made.

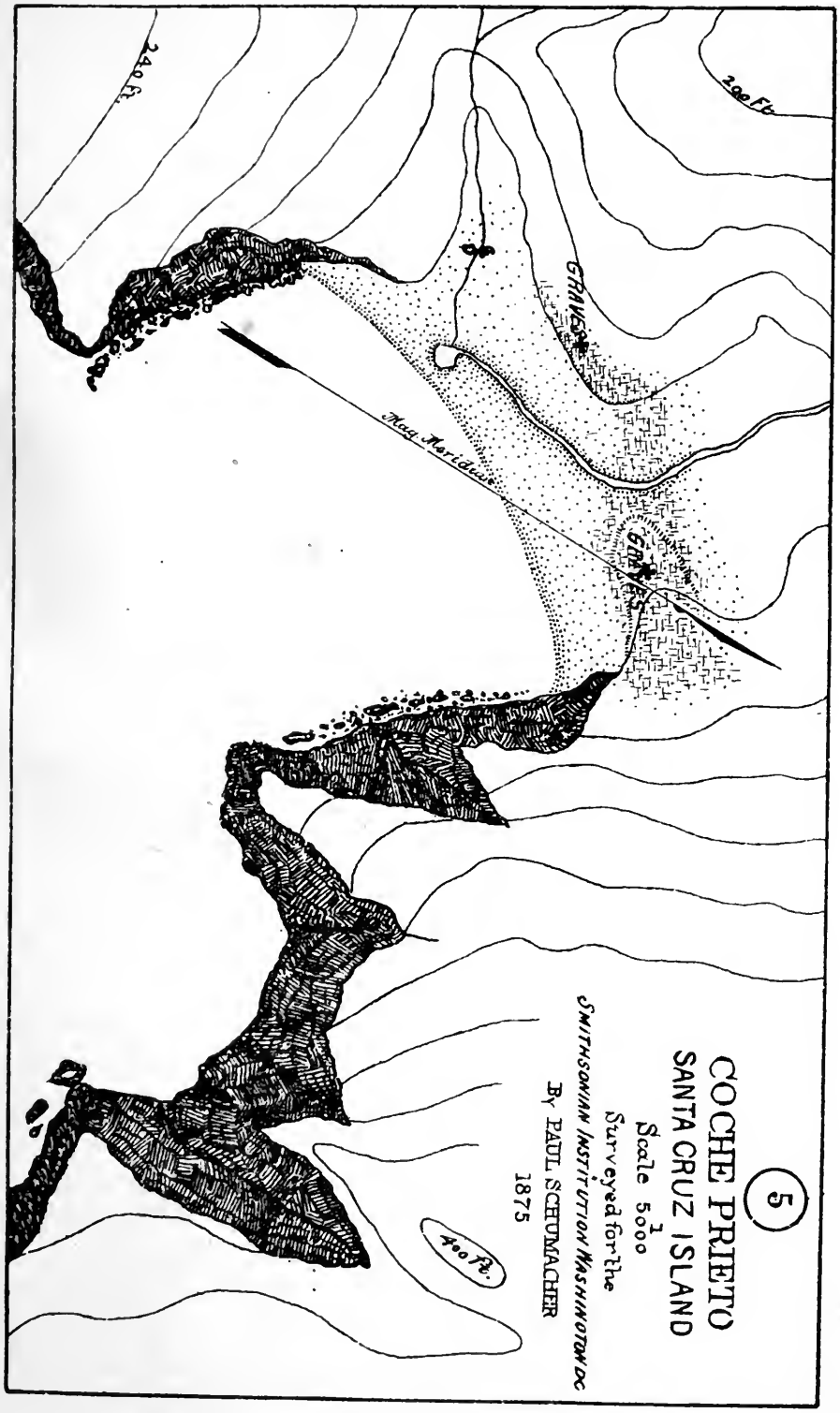
I wish to say a few words in relation to the early history of the two islands already worked up. Santa Cruz, Santa Rosa, and San Miguel, it is well known, were discovered by Cabrillo in 1542, and named by him San Lucas. He died in a harbor in one of these islands. The record says:— "He sailed from Monterey Bay, and anchored on the 23d of November, 1542, in a harbor in one of the group mentioned before, and named by him San Lucas . . . . ." "On San Lucas, Juan Rodriguez Cabrillo was buried on the 3d of January, 1543. The port in which he died was called Juan Rodriguez." There seems to be hardly any doubt that the port selected by Cabrillo among the group as a shelter was the present Cuyler Harbor, which is the only well-protected port in the three islands. Water is obtainable in two springs the year round, and is plentiful in the season in which his stay occurred. Further, the record says:—"Ferrelo, his pilot (forced by strong winds to return from his northern trip, made in compliance with the wishes of the dying commander to proceed as far to the north as possible), dared not to re-enter this port on account of dangerous breakers at its entrance." This corresponds entirely with the appearance of Cuyler Harbor during the time of rough sea, because from the eastern side of the bay to the rock-islet heavy breakers roll over the partially exposed reef and the rocks in the bay a little to the westward of it, so that, coming from the northwest, its way of approach, the entrance seems barred by breakers and impassable. Taking Cuyler Harbor and the ports in Santa Cruz and Santa Rosa into consideration as shelters, and comparing their natural formation with the historic record, there seems to be no doubt that the harbor on San Miguel, and not Prisoner Harbor on Santa Cruz, as some believe, is the port in which Cabrillo died. We did not spend any time in searching for his grave on San Miguel, where the best location is offered between the spring below the house and the east end of the harbor, but, to satisfy my curiosity, we dug in a place at Prisoner Harbor, which was well described to me in a letter of a southern gentleman, and in a very positive manner, as

the grave of Cabrillo, but in vain did we try to enable the Spanish nation to erect for him a monument in commemoration of his noble deeds.

I left Santa Cruz Island on June 12 for Santa Barbara, where I met Dr. H. C. Yarrow, in charge of Lieutenant Wheeler's scientific corps, making researches on the mainland for Indian remains. I joined him for a day while working at Galeta, and found this place yielding large quantities of all kinds of implements.

In the mean time, the schooner Star of Freedom, which I had chartered, arrived with a party on board to convey us to San Nicolas Island (Maps 9 and 10) [Plate 16]. We reached this island at night-fall on June 19, with the wind blowing lively, which compelled us to anchor at the southeast end of the island. We expected a campaign worse, if possible, than that at San Miguel, as the island appeared to be a faint lump in a thick fog-like cloud of sand, which was whirled densely over our neat craft, although we were a half mile off shore. On the low sandy flat, not far off, the breakers for a distance of half a mile rise to a great height, and cause a roaring like thunder; at intervals, when the burst had passed away and the infuriated wind slackened in the rigging, we heard the howling sea-lions in the kelpy waters, if not at their rookery on the near shore, all of which failed not to impress with its wild charms. In the morning we made our landing, though the sea was rough, and as the swells, caused by a strong current that passes, sweep the shore at an angle, care had to be taken to prevent the boat going broadside on, which would have been sure to capsize her.

The island, a Government possession, is a mass of soft, coarse, yellowish-gray sandstone, about 600 feet in height; its length is considered 7 miles, and its width 3 miles. The plateau, which seems almost level, falls off on both sides in steep gulches and ravines, where the eye is met by innumerable cave-like outcarvings done by the grinding sand. The northwest end is sandy; dunes stretch across the island as far as the depression, on the end of which the *adobe* house is located. The vegetation is like that of San Miguel, and also ruined by overstocking it with sheep, which are here found in a like starving condition. Near the house on the northeast side we found some malva-bushes cleared of their foliage to the reach of a sheep, which gave them the appearance of scrub-oak trees when seen from a distance. There are few trees near the house, where a strong never-failing spring supplies the necessary water, which has, as on San Miguel, a mawkish alkali taste. The shifting sand has almost buried the house erected by the stock-raising company, and with it its old and only inmate, the superintendent. Farther on to the northwest, at the so-called Chinese Harbor, is another spring, with good water. It was on the northwest end, on the dunes, that we found the shell-mounds abundant, although some are found at intervals all along the shore toward the sandy flat on the southeast end, beyond which but few small ones exist. None exist on the southwestern shore; but they appear again at the northwest end



Map of Coche Prieto, Santa Cruz Isl

about the Chinese Harbor. The mode of burial on this island is different from that on islands previously investigated. The bodies rest in separate graves, which we found were not marked by whale-bones, stones, or other material elsewhere usually employed, and lie on their backs, the feet drawn up, the arms folded over the chest, and the head either resting on the occiput or on the side or sunk to the breast. The skeletons, as a rule, were facing the east, although other directions were observed. Many of the bodies show signs of having been buried in matting coated with asphaltum.* Most of the skeletons and implements are laid bare by the winds, and those are often much worn by the grinding action of the sand. In a mound one mile northward of the sand-flat, at the southeast end, we found the whale-bones apparently indicating the last resting-place of those that accumulated the kitchen-stuff, but by digging into it found the ribs of whales to be the remains of houses rather than the marks of graves, planted in a circle, and their natural curve so adjusted as to form the frame of a hut in shape not unlike a bee-hive, which was in some instances quite well preserved.

Our *modus operandi* was here changed; spade and pick were dispensed with, and our party went over the shell-mounds and carried the relics to heaps, which afterward were conveyed by horses procured from the superintendent to our boat in the small cove, and thence taken by water to our camp for a careful packing. On this island two mortars were found, with the ornaments in high relief, the largest and best made pestles and sculptures in serpentine, representing sea-lions, fishes, and birds, and other objects, showing a superiority in the manufacture of stone implements over the inhabitants of the two islands before mentioned. Remains of fish-hooks were found plentiful, but, weathered out as they were, could not be saved. Together with the above-mentioned sculptures, several specimens of a hook-like implement were collected, made of serpentine; also a tube and pestle of the same material, the use of which I was unable to trace. The money deposits of shells and stone on this island are very remarkable. They were found before only in graves, buried with their former owner, but here we found in some places on the shell-mounds, apart from the skeletons, numerous small heaps of the shell *Olivella biplicata*, and some of the land-shell *Helix strigosa;* also pebbles of uniform size, about as large as a pigeon's egg, apparently coated with asphaltum, or burnt and blackened by fire; they averaged in quantity from a half to one cubic foot, and were evidently stored there and afterward exposed to the drifts of sand, forming conspicuous diminutive hillocks. We found as many as sixty of these deposits on one shell-mound. This, with the position of some of the implements we observed, seems to point to the fact that the last inhabitants left or were taken off suddenly. We found, for instance, instead

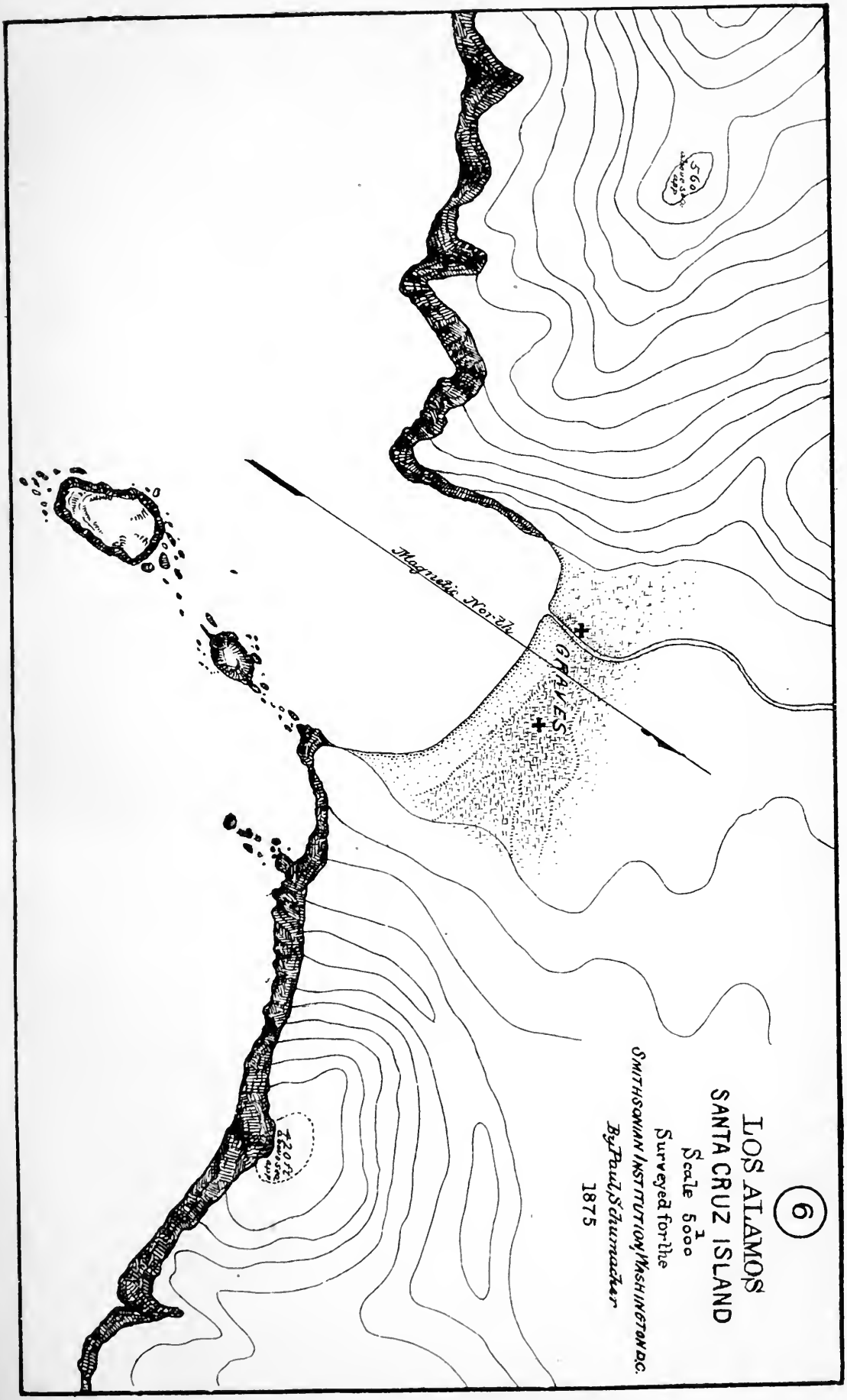
* Asphaltum is plentiful on all the islands, washed ashore among the rocks. A submarine spring of it exists in the channel between Prisoner Harbor and Santa Barbara, and at several places along the adjoining mainland.

of being buried with the dead, many mortars set in the ground to the rim, the pestle either in its opening or lying alongside, as if it had done its duty only some days before. On this island, more dog skeletons were found among the *debris* of the deserted hearths than on any preceding one, although in only one instance were we able to collect many of the parts of a full skeleton; but we were more successful in obtaining good skulls. Tradition speaks of an extinct race of dogs that inhabited these islands. Even in 1857 a reliable gentleman thought he had seen some of these same dogs on San Clemente, which he described to me as large, slender, coarse, and hairy canines, resembling rather a coyote or wolf than our better-natured domestic species. Whether the aborigines feasted on this last resort of a starving modern traveler, we cannot tell, although we know that they were not epicures according to our taste, as the many bones of sea-fowls testify. The red-back abalone is abundant among the shell-heaps, although none of this species is found on the island at the present time, which is proven by the modern shell-deposits accumulated by the industrious Chinese, who dry this shell-fish here in great masses for exportation to China. The material for the manufacture of sandstone mortars and pestles is found among the water-worn bowlders on the beach; articles made of serpentine of course had to be brought from abroad. Pots of magnesian mica, or even fragments of them, were not found, and yet the presence of drift-wood permitted cooking, as plenty of charcoal bears witness. During our stay on this island, we obtained 127 mortars and about 200 pestles, and many boxes of smaller implements, trinkets, and ornaments, which swelled our collection considerably.

At the appointed time, the schooner Star of Freedom returned, and we left San Nicolas Island on June 30.

Although the time of two months, as proposed for this tour of researches, had nearly been consumed by the great ethnological results obtained on the islands already visited, and I was eager to do some work on the mainland to complete the series of my collections made in the previous year, I could not decide on passing Catalina, which, even by its historical records, promised such interesting additions to the island collection; yet I was aware of the magnitude of the work I had undertaken to do in eight days, the time the schooner was to come and take us off, a work which would require a month's diligent activity in order to be exhaustive. If our short visit has, therefore, left much to be done, the cause can easily be traced. But by our visit I was enabled to gather valuable information, and to give such hints as will make a search, if the necessary time is employed, a success, and reward a close observer with much that is new, and probably of still greater interest than the objects found on the other islands.

The island of Santa Catalina (Map 11) [Plate 17] appears to be a long mountain removed from its base and planted in the wide ocean, whose waters are here wonderfully transparent on account of the micaceous



Map of Los Alamos. Santa Cruz Is!

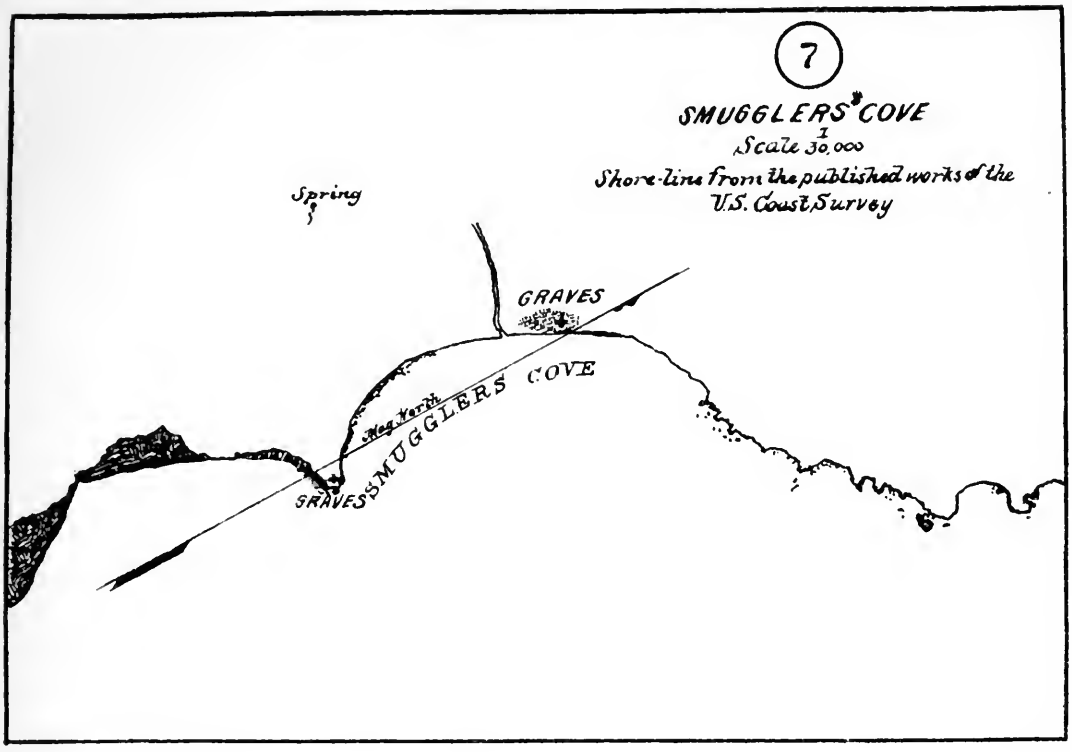
bottom. This mountain, about 18 miles in length and 3,000 feet high, descends in innumerable steep gulches and ravines, and often abruptly ends in perpendicular bluffs, some of which are nearly 1,000 feet high. About 5 miles from its northwestern end, the island is almost cut in two by a remarkable isthmus, forming on the northern side Isthmus Cove, and on the other, the southern side, the fine but narrow port of Catalina Harbor. The two parts of the island are connected only by a narrow strip of land not 40 feet above water, and about 600 yards from ocean to ocean. It is sparsely timbered with stunted oaks and some willows, with plenty of water in springs, and several wells. Some mining has been done, but to no advantage. The island, which was discovered by Cabrillo in 1542, belongs to James Lick, and is settled by a few squatters, mostly engaged in stock-raising, fishing, &c. The Government barracks at the isthmus—quite imposing buildings in this solitude—are still in good condition, and offer now shelter to picnic parties from the neighboring mainland, as also to sheep-shearers in the time of wool-clip, some signs of which it strongly bears in the remaining filth and kitchen-refuse of the shearer. Rattlesnakes and centipedes are not scarce, and the former we caught on the very porch of the barracks. In addition to the small gray fox,[*] the only wild animal on the other islands, we find here the ground-squirrel plentiful.

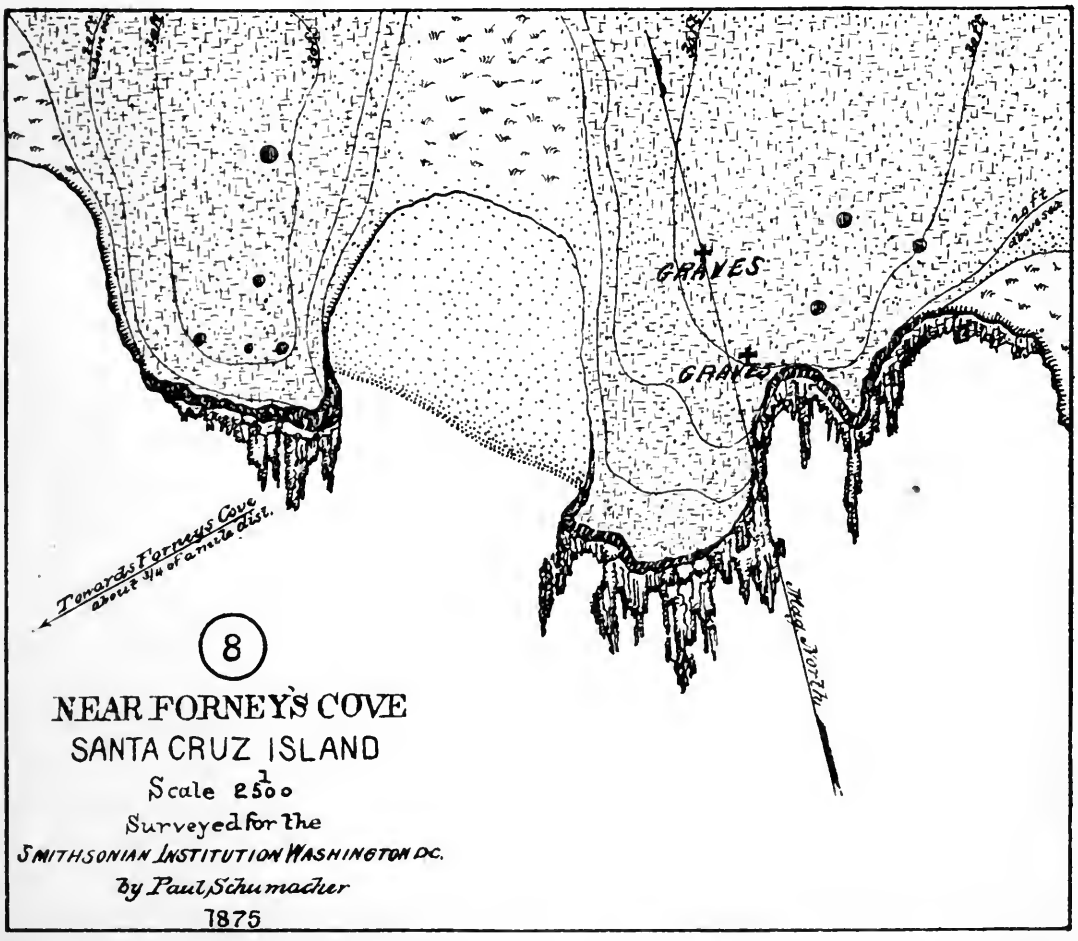
At the Isthmus Cove, we found quite extensive remains of a *rancheria*, but all our efforts to find the graves of its former people were of no avail. Back of the marshy bottom at this cove several marks of houses are still noticeable, and there we found some graves. In front of the barracks still can be traced, on the highest ground of the isthmus, some slight depressions in the earth, where formerly houses of the aborigines stood, probably the same which Padre de la Ascencion, chronicler of Vizcaino's voyage, mentions in describing a temple with an idol erected on this isthmus. The idol was much looked for, but we only found the hind part of a stone figure representing an animal like a dog. Some pieces of a mortar of a very hard, brick-colored porous rock were found, of which material none had been noticed before. On the other side of the isthmus, at Catalina Harbor, the sides rise steeply, and the ground is gravelly and rocky. Here we find no signs of a settlement. With our boat we made explorations to the northwest and southeastward, along the eastern shore of the island. Toward the southwest, within a distance of 6 miles from the cove, we found many minor and shallow shell-deposits over hard ground, and in connection with them very distinct marks of two, three, sometimes five houses, but failed to discover any graves. All these places had been overrun by miners, and we therefore found only fragments, where we otherwise could have made quite a collection in surface-finds. To the northward we visited a shell-mound, at Johnson's place, which returned no surface-finds, being so often visited by picnic parties, neither are graves traceable. Except a few skeletons

[* The animal here mentioned by the author is the *Urocyon littoralis* of Baird.—Ed.]

dug up at the isthmus, no others could we discover within the reach of our boat-excursions during the limited time of our stay. By all the information I could gather, and by the circumnavigation of the island, I am convinced that the southeastern end is the richest part of the island, and promises a good reward to a collector. There we find many small coves offering fine boat-landings, bold, rocky shores, with an abundance of shells and fish in the kelpy waters. Here also we may find the rocks used by the Indians for the manufacture of their house utensils, which are claimed to come from this island, where they were made and disposed of in canoe-loads among the inhabitants on the mainland, taking such necessities in return as the island was in want of. Only steatite is found about the isthmus, and, as it appears here, it was only used for making ornaments; but no magnesian mica, of which the cooking-vessels are manufactured, nor did we find any serpentine, of which the beautiful bowls and cups consist. But this island is very rich in varieties of minerals, and it is therefore probable such rock is found, which, no doubt, offered a great field of industry to the islanders, considering the many utensils we have found already made of this material. According to the reports, there is no doubt that factories existed on this island which supplied the Indians on the mainland, even as far as San Luis Obispo and Monterey, with their cooking pots, or *ollas*. The rock must be looked for at the southwest end; and if any manufacturing has been carried on there, fragments will be revealed at the different coves, and guide the investigator to the quarries and factories.

Before leaving the islands, I wish to mention those which I did not visit, the reason being want of time, and to explain why I gave preference to those explored. The first island I passed was Santa Rosa, which lies between San Miguel and Santa Cruz. It is 15 miles long and about 10 miles in its greatest width; is much the same in appearance as Santa Cruz, only not so high—being about 1,200 feet above the sea—and more of the rolling-hill order; yet much of its shore-line, which is about 50 miles in extent, is bold and difficult of access. Having had better information as to San Miguel and Santa Cruz when I began the research on the islands, I visited these two first; and as the channels between these islands and Santa Rosa are only 4 and 5 miles, respectively, I was satisfied that the large collection made comprises about all the forms that may be found on islands lying so close together; or at least I thought there was more probability of adding new forms at a distant island, as, for example, San Nicolas, which I therefore selected instead. I am well aware of the great deposits of kjökkenmöddings on Santa Rosa Island, as I was informed of them by the owner, who is a reliable man, and I observed some of them while passing by. I was also told that many implements are scattered over the surface, especially where the contents of a cemetery have become exposed by the winds, and the bare skeletons now bleach in the sun. Moreover, certain parties spoke of caves containing human remains, which may be





Map of Smugglers' Cove and locality near Forney's Cove, Santa Cruz Island.

authentic; but to this sort of promises I was treated on the two islands mentioned. My time and, what was more important, the amount appropriated for this work had to be taken in consideration, as well as my great desire to get all I could discover.

East of Santa Cruz, with a channel of 4½ miles between, lies the bold and rocky island of Anacapa, parted in three by narrow passages. I passed this island from all sides, but could not discover any shell-deposits. It seems quite probable that there are none, as their exists no water on this island.

Proceeding 38 miles southeast, we reach Santa Barbara, the smallest island of the group. It has but 2 miles shore-line, is smooth-topped, and about 500 feet high. A small shell-mound is found on this island, with some fragments of pestles and mortars. There is no water, and it seems to have served as a way-station between some of the islands and Santa Catalina.

Thirty-five miles southeast from Santa Barbara, or about 20 miles due south from Santa Catalina, lies the island of San Clemente, one of those discovered by Cabrillo. It is a large island, measuring about 20 miles in length and 2 in width. The southeast end is high, bold, and rocky, and slopes toward the northwest terminus, which is covered with high dunes for many miles. I was informed by a gentleman of the United States Coast Survey of the existence of large shell-mounds on this island, especially of one located on the high dune, of great circumference. A whaler, who usually spends the months of May, June, and July on Clemente to kill sea-lions, told me of natural basins, worn in rock on the high plateau at the southeast end, in which rain-water of the winter is stored, the only water on the island. Although this natural reservoir may have been very convenient for the aborigines, it is well for the visitors to bring a water-supply from abroad, as it is no small task to reach the water here, and, indeed, on most of the islands. With the exception of Santa Rosa, Santa Cruz, and Santa Catalina, no island should be visited without bringing a supply of water. Even on San Miguel, although within easy reach, the water is distasteful. So, also, on San Nicolas, where a landing on the northeast side, near the house and spring, is not always practicable.

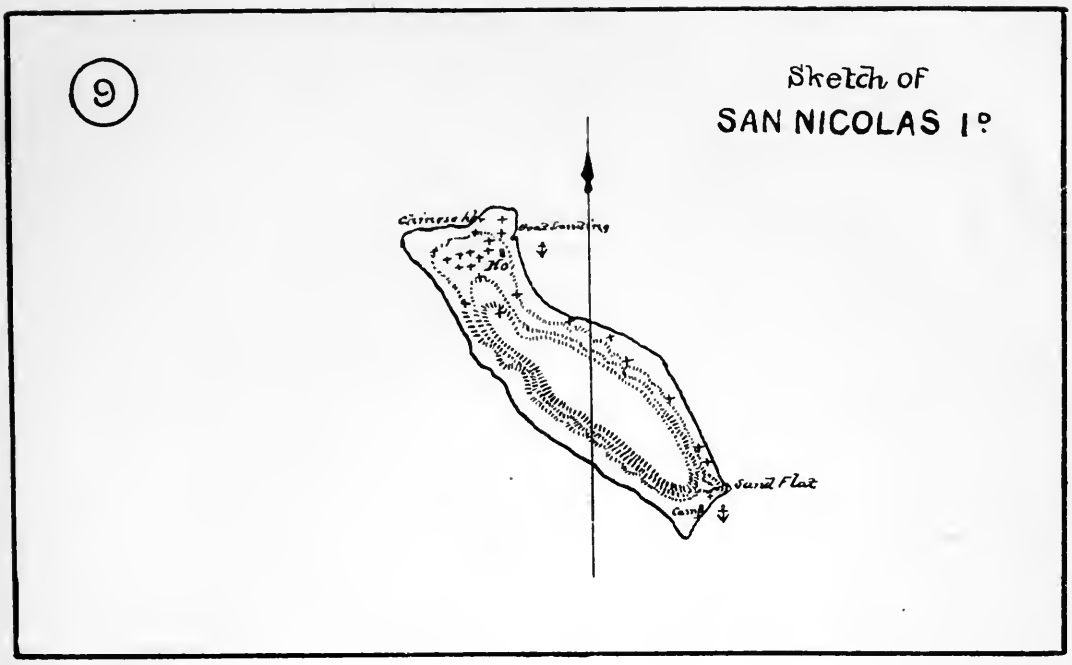
Finally, I will say a few words as to the age of the deserted settlements on these islands. According to the records, the southwestern islands were inhabited at the time of the discovery, but not the northwestern group. The appearance of the kjökkenmöddings, which I was enabled to compare with such remains occurring on the Pacific coast for a distance of a thousand miles, impresses me as not dating far back by the absence of that ash-like appearance which is due to the effects of time; and when I examined the shell-mound of Santa Catalina, corresponding to the very settlement which Viscaino mentions, I considered it slightly older than those investigated on Santa Cruz and San Miguel. I venture, therefore, to say that the islands in the Santa Barbara Chan

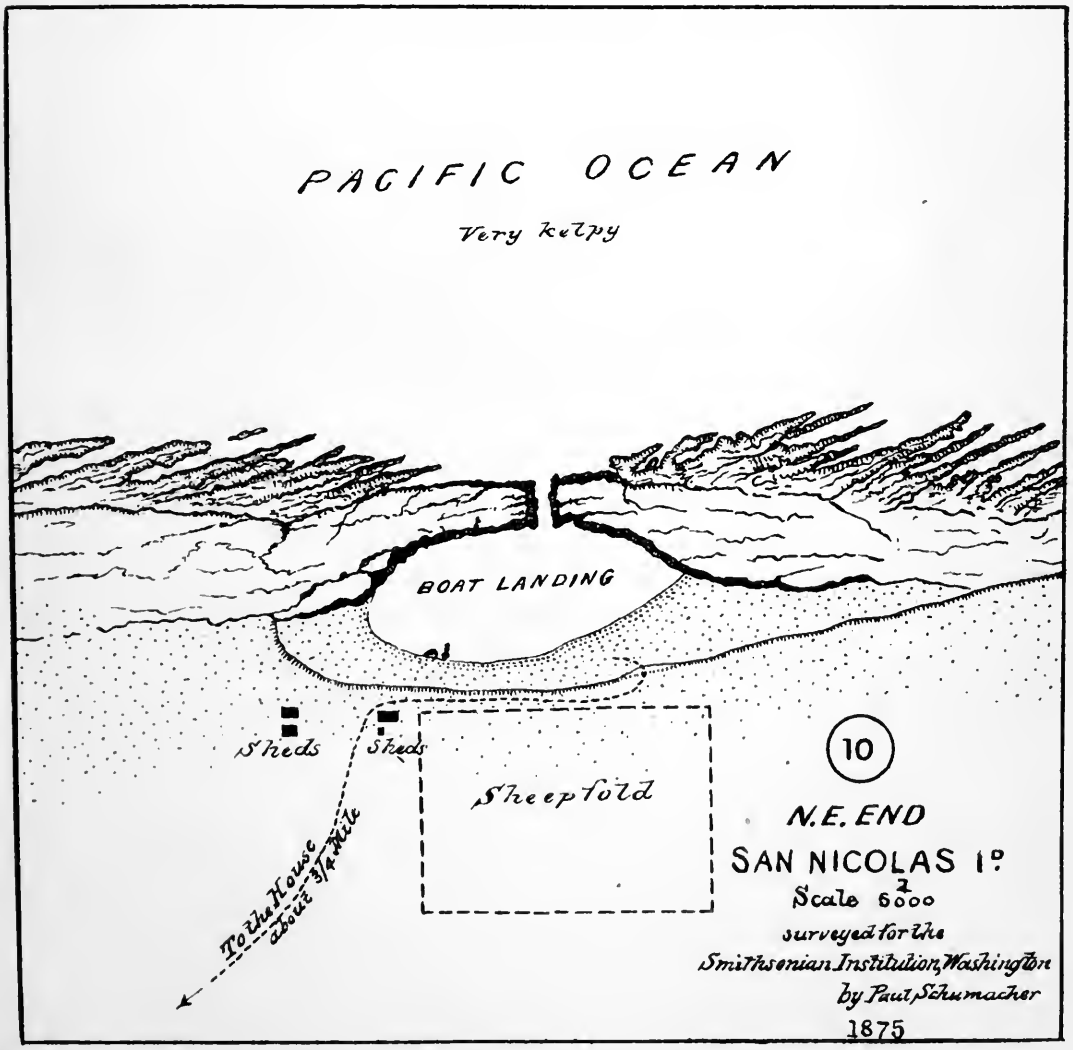
nel were peopled in the sixteenth and seventeenth centuries by immigration of Indians from the neighboring continent, whose habits in building their towns, implements, weapons, and ornaments they retained, keeping up a close intercourse with the mainlanders. The depopulation of the islands certainly occurred about forty years ago, and is still well remembered by some people living on the adjacent mainland. The *padres*, about that time, took the Indians from Santa Cruz, Santa Rosa, San Miguel, Santa Catalina, and probably San Clemente; while Captain Isaac Williams, in the year 1836, then collector of the port of San Pedro, took the Indians from San Nicolas for the same end, viz, their subjection under the missions.*

We left Catalina Island on July 6, and anchored in Santa Barbara Bay on the 10th, having been detained by calm weather, which often prevails in the channel in this season. At Santa Barbara, I again met Dr. Yarrow and the other members of Wheeler's scientific corps, who told me of their great success at the place called Dos Pueblos. As their excavations had not been finished, and promised still great returns, I communicated the fact, and was requested to do some work there.

Dos Pueblos (Map 12) [Plate 18], on La Patera rancho, is said to be 18 miles distant from Santa Barbara by the northern coast-road, and, according to the United States Coast Survey map, 16 miles in a straight line. Here existed once two towns, or pueblos, which originated the name of this place. One town was very prominently located on the mesa-land, on the right side of the stream, near the shore; the other one, below, on the sloping left bank of the same creek. It is said that the creek had been the boundary-line between two tribes, distinct in language as well as in customs. There is also a speculation that this was the place seen by Cabrillo, and mentioned as *casas grandes*. However, we found this place remarkable for its kjökkenmöddings, the appearance of its town-site, its old worn trail along the face of the bluff, and, above all, its location, which comprises the cardinal features of a well-located aboriginal coast settlement, overlooking the wide ocean spread before it, with its offerings of fish and mollusks, water near at hand, a fine game country back of it, and a sandy soil easy to work with the primitive tools of these people. The yield of the cemetery was extremely rich in all kinds of implements, although a good part of it had already been worked out by my predecessor. It was observed that some parts of the grave-yard returned the more valuable relics, like utensils of steatite, spear-points,

* In 1811, a ship commanded by Captain Whittemore, belonging to Boardman & Pope, a Boston firm engaged in the fur-trade, brought down from Sitka thirty Kodiak Indians for the purpose of hunting otters on San Nicolas Island, and left them there for two years. A feud arose among the old settlers and the new-comers, which, it is said, caused the extirpation of the male islanders at the hands of the well-armed Kodiaks. When, in 1836, the last Indians were taken from San Nicolas by Captain Williams, a woman was accidentally left, and twelve years afterward discovered by Captain Nedever, giving rise to many newspaper accounts.





Map of San Nicolas Island.

&c., while other places in the same burying-ground compensated our labor with the common mortar and pestle.

The lower settlement does not indicate as long a period of habitation nor as large a town as the upper one. The graves are located in a sticky, dark ground, slightly mixed with gravel, and difficult to dig up as compared with the common soil of burying-places. The short time left us before the departure of the steamer, after finishing work at the upper cemetery, did not admit of an entire excavation; and, on the other hand, the aspect was not inviting enough, and promised not sufficient work to our enlarged party for a stay to await another steamer, even if my proposed northern trip had left us any time to spare. We had here five working-days for excavation and packing, during which time an addition of seventeen large cases was realized.

On the 18th and 19th of July, our party moved back to Santa Barbara, and I started on the following day to San Francisco.

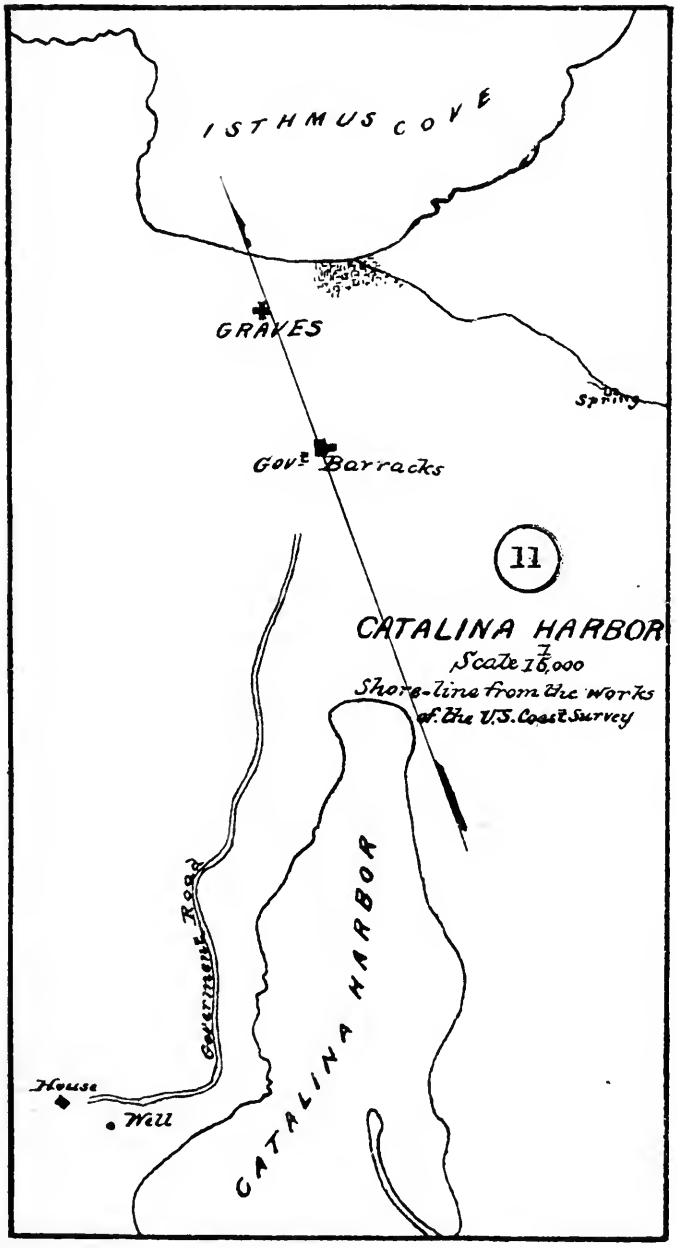
After a trip to Oregon, which I describe in another place, I returned again to the southern coast of California, to make some further researches. My starting-point for this trip was San Luis Obispo. I left this place in the beginning of January, with two men and the smallest camp-outfit possible, for the Rancho de los Alamos, on which several graves had been reported by one of the owners of the land. Unfortunately, it was not as represented. We also visited Alamo Pintado (painted alder), now known as Ballard Stage Station, which is said to have been once a great resort for the Indians in the early times of the missions. We made inquiry of the people at the station, and found them utterly ignorant of the existence of such a cave, which, as my informant said, ought to be "within a hundred yards or so" from the station. The geological stratification is not adapted to the formation of caves, and gives no hint where to look for them. After a short, useless search, we were compelled to return for quarters at Bell Station. We went back to La Graciosa, a small settlement at the boundary-line of Los Alamos grant, and about eleven miles from the ocean shores, near the Santa Maria River, and there hired a guide to bring us through the mountain-pass to a place at the beach about 5 miles to the southward of Point Sal. The existence of a shell-mound in that location was known to me, I having observed it two years ago with the aid of a telescope from the height of Point Sal, while engaged in the works of the United States Coast Survey. This *rancheria* is called *Ōs-bi* (Map 13) [Plate 19] by the old Spaniards. Its appearance is a grand sight to an eager collector, on account of the great masses of kjökkenmöddings found here. Along the shore are low dunes, and back of it a grassy flat, which extends toward the steep foot-hills of the Coast Range, and affords ample room for a settlement, which we still can trace in many house-sites. The subsoil of the flat is deep, and consists mostly of decayed shells of an ash-like appearance, which are of a greater age than those on the dunes. The dunes, extending half a mile in length and about a hundred yards

in width, are covered with glittering shells, bones, great masses of flints, and hundreds of tons of broken rocks and cobble-stones. Stratified rocks on the shore reach out to sea, and must have been formerly, as they are now, rich in shells, the adjoining waters teeming with fish, of which the masses of kitchen-refuse offer convincing proof. The dunes toward the south are high, and partially covered with a luxuriant growth of chaparral and chemisal, the sheltered home of timid rabbits, quails, and other game. Water is especially plentiful in a stream south of the settlement, and of a better quality than in the gulch right north of it.

Early the next morning I went over the ground, studying the location of the settlement, the nature of the soil, and such signs as would guide me in the discovery of the graves; and, as their marks were still visible above the ground, I had no difficulty in finding a large cemetery close to the beach, which forms here a perpendicular bluff of 50 feet in height. In size, but certainly not in the yield of implements, this grave-yard could be favorably compared with the one on the *mesa* at Dos Pueblos, which returned about fifty boxes of relics, while here hardly four were filled. The large spear-points of chalcedony, one measuring $10\frac{1}{2}$ inches, of which eight were exhumed, were exceptionally valuable. The surface of the grave-yard, under which we found buried at a depth of 5 feet in the average nearly 400 skeletons, measured 600 square feet. If we now take on an average three skeletons one above another, we find that the surface space required for these three bodies was $4\frac{1}{2}$ square feet, or 3 by $1\frac{1}{2}$ feet, which would be the most convenient proportion to fit the doubled-up corpse of an aboriginal burial.

While in camp at *Ōs-bi*, we encountered a heavy winter rain-storm accompanied by snow and hail, from which we had much to suffer under our light shelter, and which deprived us even of our camp-fire.

On the 25th of January, we started out to San Antonio rancho, where a cemetery was reported, which we found to be situated opposite the house of the stock-raiser Olivera (Map 14) [Plate 20]. This place we found nearly all dug up by the Spaniards for the sake of obtaining some *ollas* and mortars, which are a great addition to their meager household utensils in such an out-of-the-way place. The result of our labors here was very poor. Much disappointed, but with hopes of a change for the better, we went along on our difficult trip toward the mouth of San Antonio Creek, over a country which was hardly ever traversed by a wagon, and, properly, should be reserved only for the roaming *vaquero*. About four miles from the mouth of the San Antonio and a mile from its right bank is Burton's place, an old, dilapidated, deserted *adobe* house, and back of it a small pond, near which a cemetery was reported. The house, the lagoon, and even some signs of former Indian huts, were readily found; but, with all the pains we had taken, the burial-place could not be discovered, and yet its location is clearly pointed out by the formation of the surrounding ground to be back of the pond. Likely, the



Map of Catalina Harbor.

loose and shifting sand of the dunes, between which it ought to be, covered it up. We remained that night in camp near the lagoon, and experienced another heavy rain and hail storm. Wet and freezing, we sallied out early the next morning to make the mouth of San Antonio Creek, which had much swollen, and had to be crossed at the beach, where its waters mingle with the breakers of the ocean. The crossing of the creek delayed us many hours, and was attended with some danger. We had hardly become dry after last night's exposure in endeavoring to save our light tent, and now we had to plunge into the water to save our equipage, and rescue team and wagon out of the sandy river-bottom. We passed Point Perdernales, and dragged over a chain of dunes to the Lompoc landing, now in course of construction. About a quarter of a mile to the northward of this landing, we found quite a shell-deposit, and some signs of houses near a spring, but no graves could be discovered.

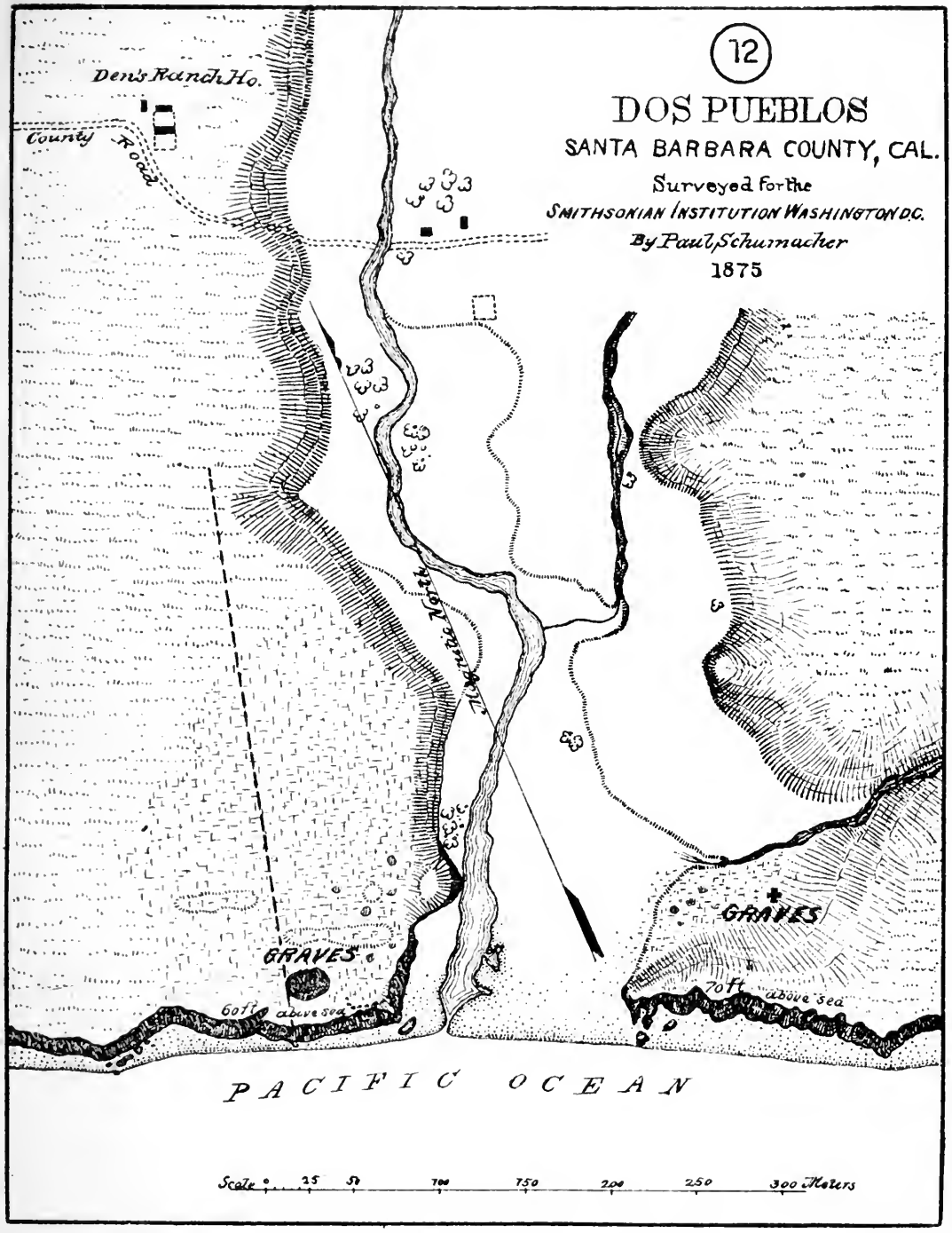
From this point, behind which is the landing, open to the southwest, but partially sheltered against northwest winds, toward the mouth of San Inez River, which is about four miles to the southward, we noticed old shell deposits, especially back of the wharf. The thick growth of chaparral prevents us from advantageously examining this place; perhaps the deposits were accumulated only by temporary visits of the Indians. At the right bank of San Inez, where a large *rancheria* was reported, we found no signs whatever. This river we could not cross on account of the late rains, and had to take our course up its banks. After a venturous travel over the hills and cañons, we reached the house of the Santa Lucia rancho, which estate, by the way, is very large, where another cemetery was reported. But I was soon convinced by the intelligent gentleman that holds it now at rent that nothing of the kind existed.

From the time we left Olivera's place, our trip was a chain of disappointments, and I therefore hastened to its conclusion. We returned again to La Graciosa, and without delay went to Guadalupe on our way to San Luis Obispo. At Guadalupe, a small jug of burnt clay was given to me by a hunter, who picked it up at a southern branch creek of the San Inez River, about 10 miles from shore, in a secluded place, where he thought could still be traced the remains of an old Indian hut. It was found alongside of an oven, or furnace, as he calls it, in which he thought it was baked. The furnace, he says, was about one and a half feet high, made of clay, round, and had but one opening—none for the draft. It was left by him undisturbed.

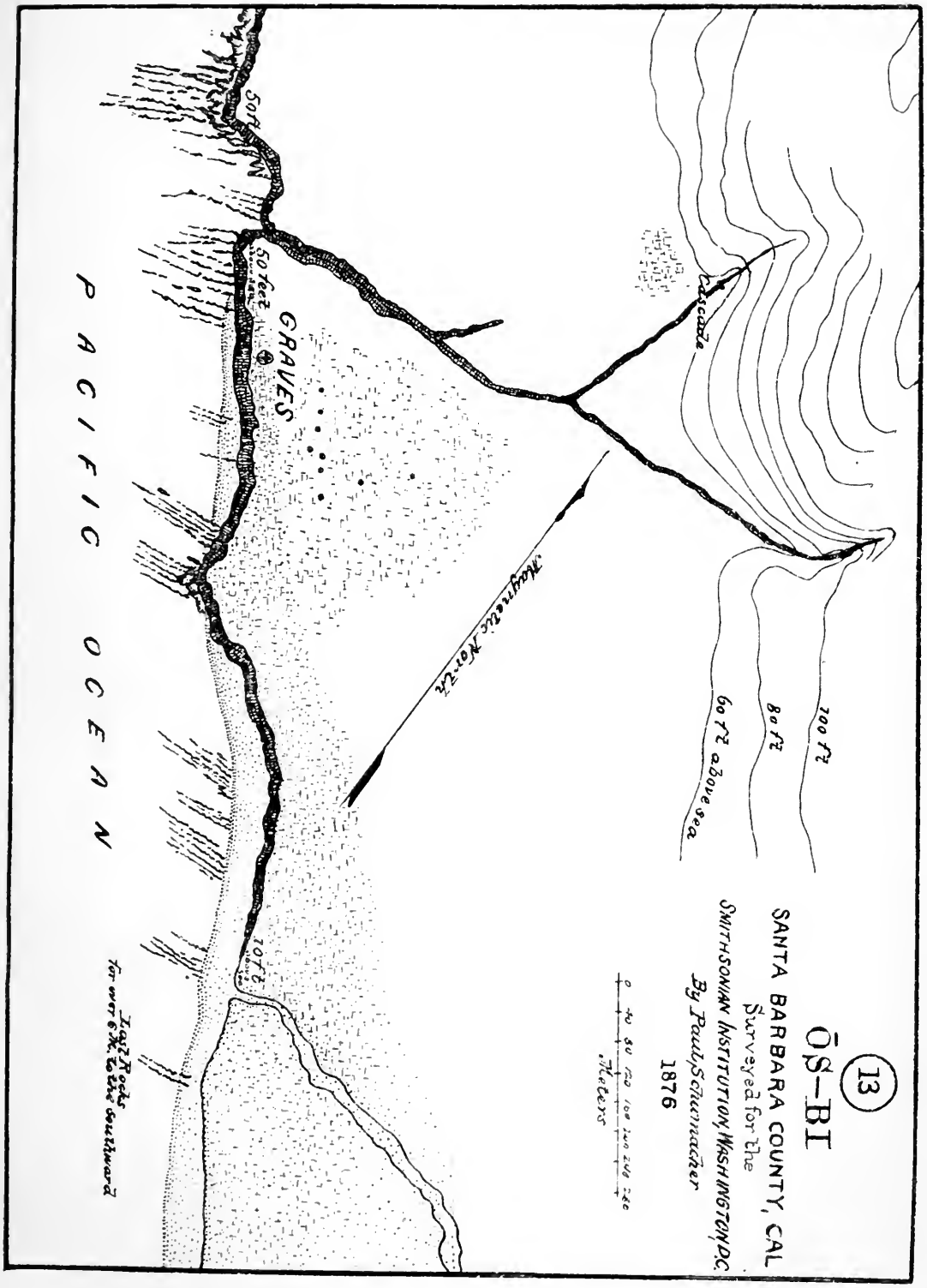
From San Luis Obispo we made a trip, at the beginning of February, to Morro Bay. We found at Morro Creek signs of an old *rancheria*. Farther north, at Old Creek, are extended shell-mounds, especially the one back of Stone's house, in the cultivated field, near the road leading back into the valley. Although plowed, permission was received for excavations. We found there, as if to give perfection to our ill-luck of

the last fortnight, the graves washed out by the creek. Three skeletons, one of which was laid bare and revealed the burying-ground, had still remained in the bank of the stream, which is very swift in the winter, and had worked out here a small bight. Some stone slabs were also found, but our spades soon worked the virgin soil of the bluff. We made search in the bed of the creek for some implements, which may have remained there, but found nothing. They were either washed to sea or carried away by passers-by.

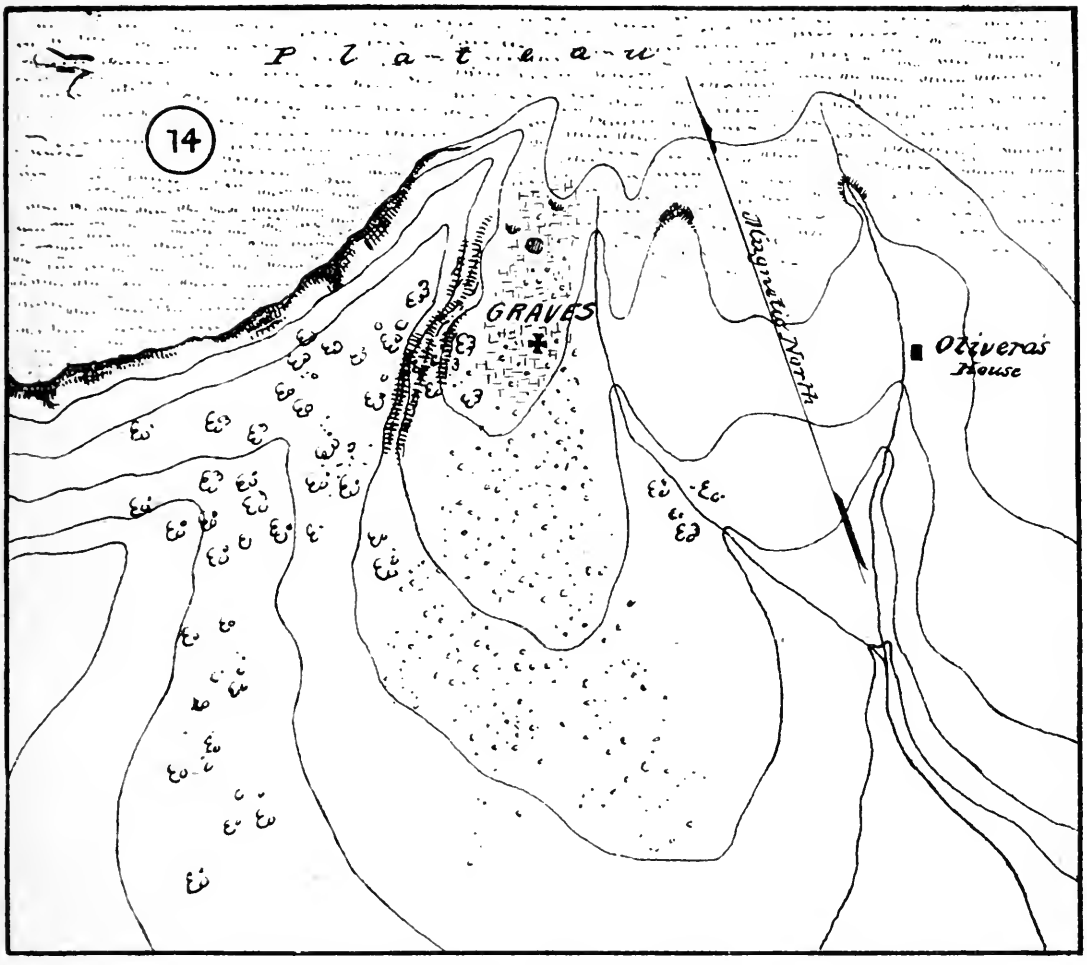
In conclusion, I will state my opinion that there are but few places left on our coast south of San Francisco Bay which promise returns in Indian relics so valuable as the results of my work during the last year, and that in a short time, say five years, when the plow of the settler shall have obliterated the last signs which now still guide the collector in finding the graves, the implements that come then to the surface will be destroyed or scattered among different people, and thus forever lost.



Map of Dos Pueblos, Sta Barbara Co Cal.

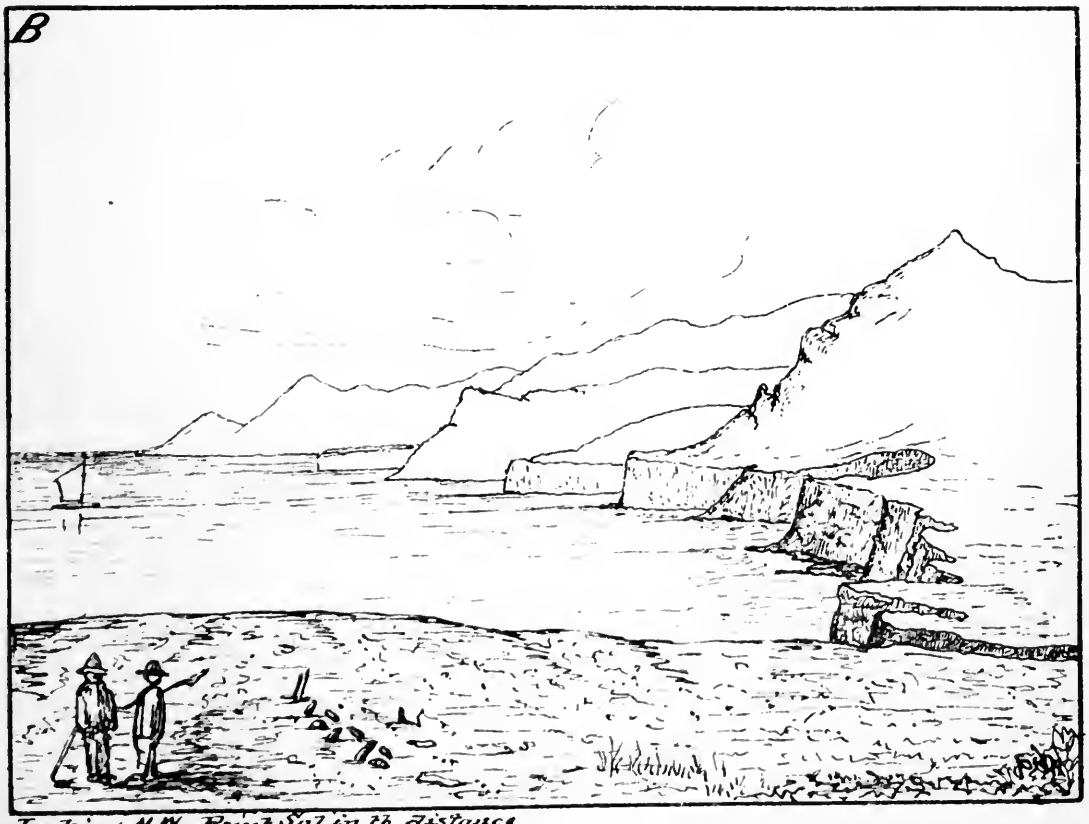


Map of Os-bi, Sta Barbara Co Cala



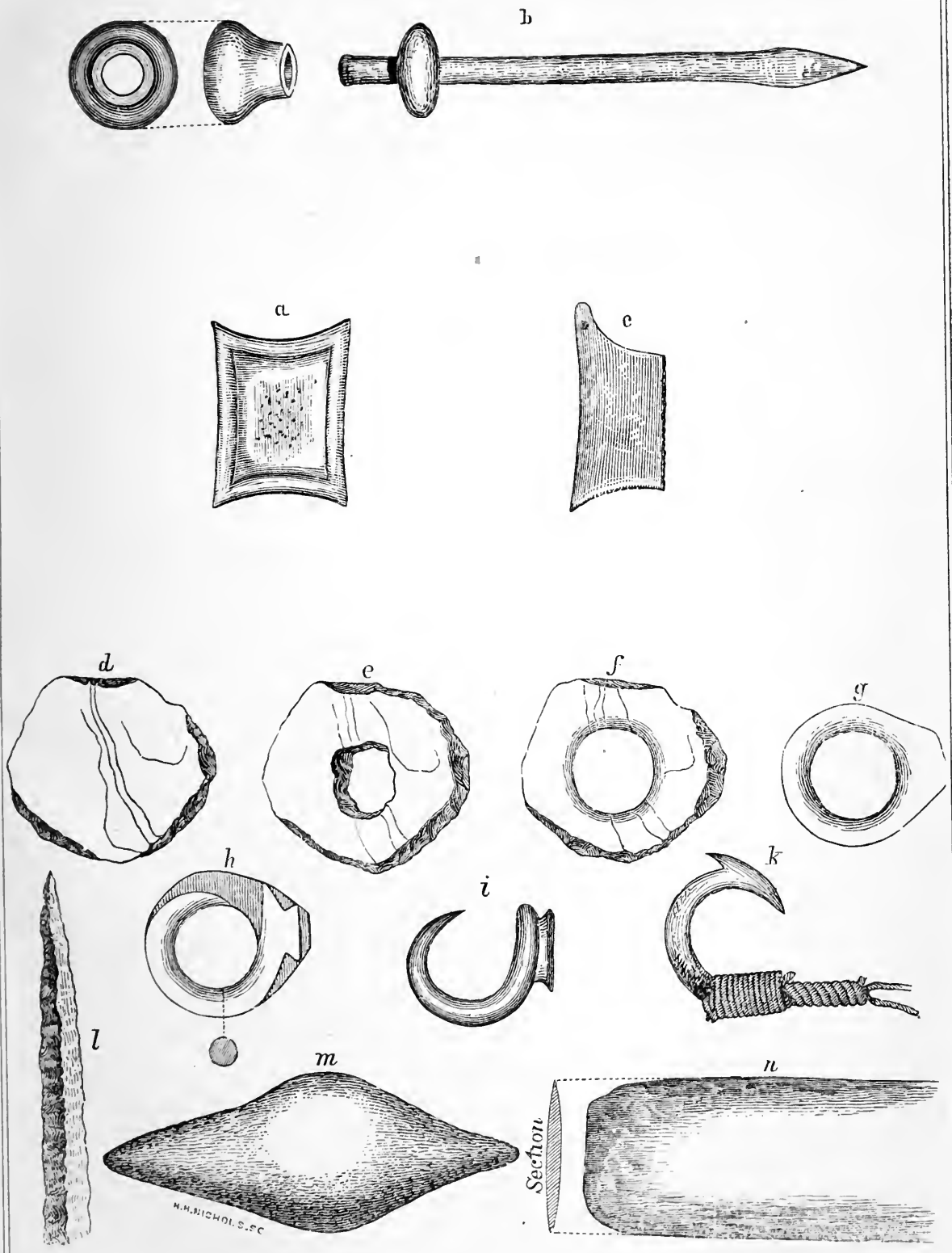
Map of San Antonio Rancho.

Looking Northward, Mainland in the distance



Looking N.W. Point Sal in the distance

Sketches of Tinker's Cove. Santa Cruz Island.



Implements from graves at Coche Prieto, Santa Cruz Island.

ART. XVII.—METHODS OF MAKING STONE WEAPONS.

By Paul Schumacher.

[Plate 29.]

I.—THE MANUFACTURE OF STONE WEAPONS. [*]

During my rambles among the remnants of our Pacific coast aborigines I had an opportunity, among the Klamath Indians, of gaining information of the manufacture of stone weapons, for which my interest was not a little stimulated by extensive collections made by our party among the deserted hearths of the coast tribes. I had the good luck to meet the last arrow-maker of the tribe, located on the right bank and near the mouth of the Klamath River, who has since joined his forefathers in the happy hunting-ground. He showed me the mode of making stone weapons, of which the following is a description.

For the manufacture of arrow- and spear-points, knives, borers, adzes, etc., chert, chalcedony, jasper, agate, obsidian, and similar stones of conchoidal fracture are used. The rock is first exposed to fire, and, after a thorough heating, rapidly cooled off, when it flakes readily into sherds of different sizes under well-directed blows at its cleavage. The fragments are assorted according to shape and size best corresponding to the weapons desired; the small ones, best fit in shape and thickness, are used for arrow-heads; similar sherds, but larger in size, for spear-points; the long narrow pieces for borers, and so on. To work the flakes into the desired forms, certain tools are required, one of which is represented in Fig. 1. It consists of a stick (*a*), which is in form and thickness not unlike an arrow-shaft and about 1½ feet in length, to one end of which a point (*b*) is fastened, of some tough material, as the tooth of the sea-lion, or the horn of elk, and even iron among the present Klamaths, although the rock does not work as well, and brittles where the edge ought to be sharp. The point is represented in natural size in Fig. 2 to better illustrate its beveled curve, which form admits a gradual press-

[*Translated by the author for the Bulletin from an earlier publication in *Archiv für Anthropologie*, vol. vii, page 263 *et seq.* The article may be considered supplementary to Arts. II. and III., by the same author, in the first number of this volume.—Ed.]

ure to a limited space of the edge of the sherd. During the operation, the rock is partially inwrapped in a piece of buckskin for better manipulation, its flat side resting against the fleshy part of the thumb of the left hand, only the edge to be worked being left exposed (Fig. 3). The tool is worked with the right hand, while the lower part of the handle, usually ornamented, is held between the arm and the body so as to guide the instrument with a steady hand. The main movements are shown at *a*, *b*, and *c* of Fig. 4. With the movement as illustrated at *a*, larger flakes are detached, and the rock is roughly shaped into the desired form; while with the movement shown at *b* long flakes are broken, which frequently reach the middle of the sherd, producing the ridge of the points or knives; and, with movement illustrated at *c*, the smaller chips of the cutting-edge are worked. The work proceeds from the point, the more fragile part of the weapon toward the stronger end, as illustrated by the unfinished borer, the form of which, as frequently found, is shown by dotted lines. To work out the barbs and the projections of the arrow- or spear-points (Fig. 5), a bone needle is used, as pictured in natural size in Fig. 7, about 4 to 5 inches long, without a shaft. The movements are those as illustrated at *b* and *c*.

II.—STRAIGHTENING OF THE ARROW-SHAFT.

On the coast of California and Oregon especially, the common willow was used for shafting the arrow of the aborigines, although any other tough straight twig may have supplied the want. The arrow of these tribes is usually about 2½ feet long; the shaft is worked round to a diameter of about $\frac{5}{16}$ of an inch, and tapers slightly toward the ends, to one of which is fastened the point, while the other one is winged with the guiding-feathers. The aboriginal warrior was well aware of the advantage of a straight arrow-shaft over a crooked one, and when therefore nature did not provide the desired perfection, ingenuity was resorted to by which it was attained. The way it was accomplished I learned from living witnesses and by the many implements found which were used for the purpose of straightening the arrow-shaft.

The twigs were cut into the proper length, worked by scraping into the desired thickness, and were left to dry in the shade. When partially dry, such bends and crooked parts which resisted the common practice of straightening were subjected to the action of the arrow-straightener. This utensil is made of steatite, a rock that well resists the destructive power of the fire to which it is subjected during the process of straightening the shafts, and retains the heat long. It is usually oval in shape, and slopes toward both ends and sides, ending in a flat base, upon which it rests when in use. Across its ridge passes a groove (sometimes two and even three), corresponding in its width to the thickness of the arrow-shaft, while the depth varies often to twice its width, according to the service it rendered, by which the grooves are deepened and at its edge even enlarged. The size varies from the one illustrated to about 5 inches in

Fig.1

Fig.2

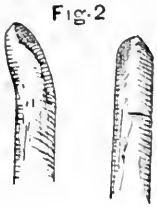


Fig.3

Fig.4

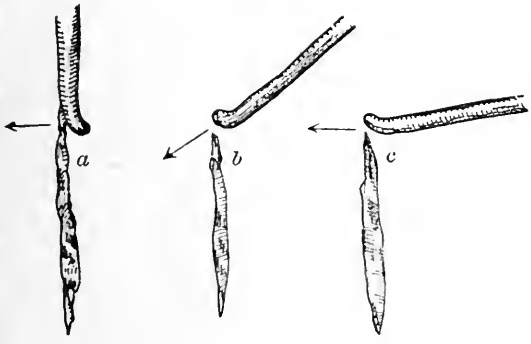


Fig.5

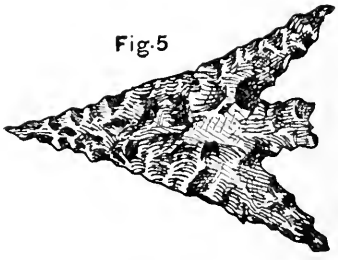


Fig.6

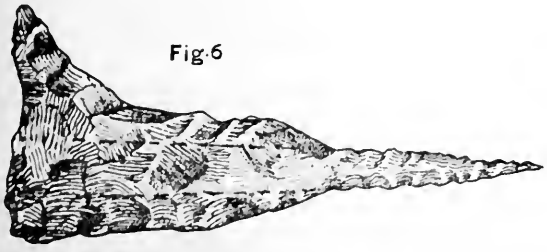


Fig.7

Method of Making Stone Weapons.

length and 2½ in width.* Into the groove of the heated utensil, the crooked part of the shaft is pressed, and by heating or steaming the wood becomes very flexible, and is easily bent and straightened, which position it will retain when cooled off. It is the same principle now employed in the manufacture of furniture, wagon-wheels, etc., of bent wood, brought into almost any shape by the process of steaming.

*A beautiful specimen of this size with three grooves was received, among other implements, from Dr. Hays in San Luis Obispo, and is now in the National Museum.

Schumacher, Paul
Researches in the kjökkenmöddings and graves of a former population of the coast of Oregon.